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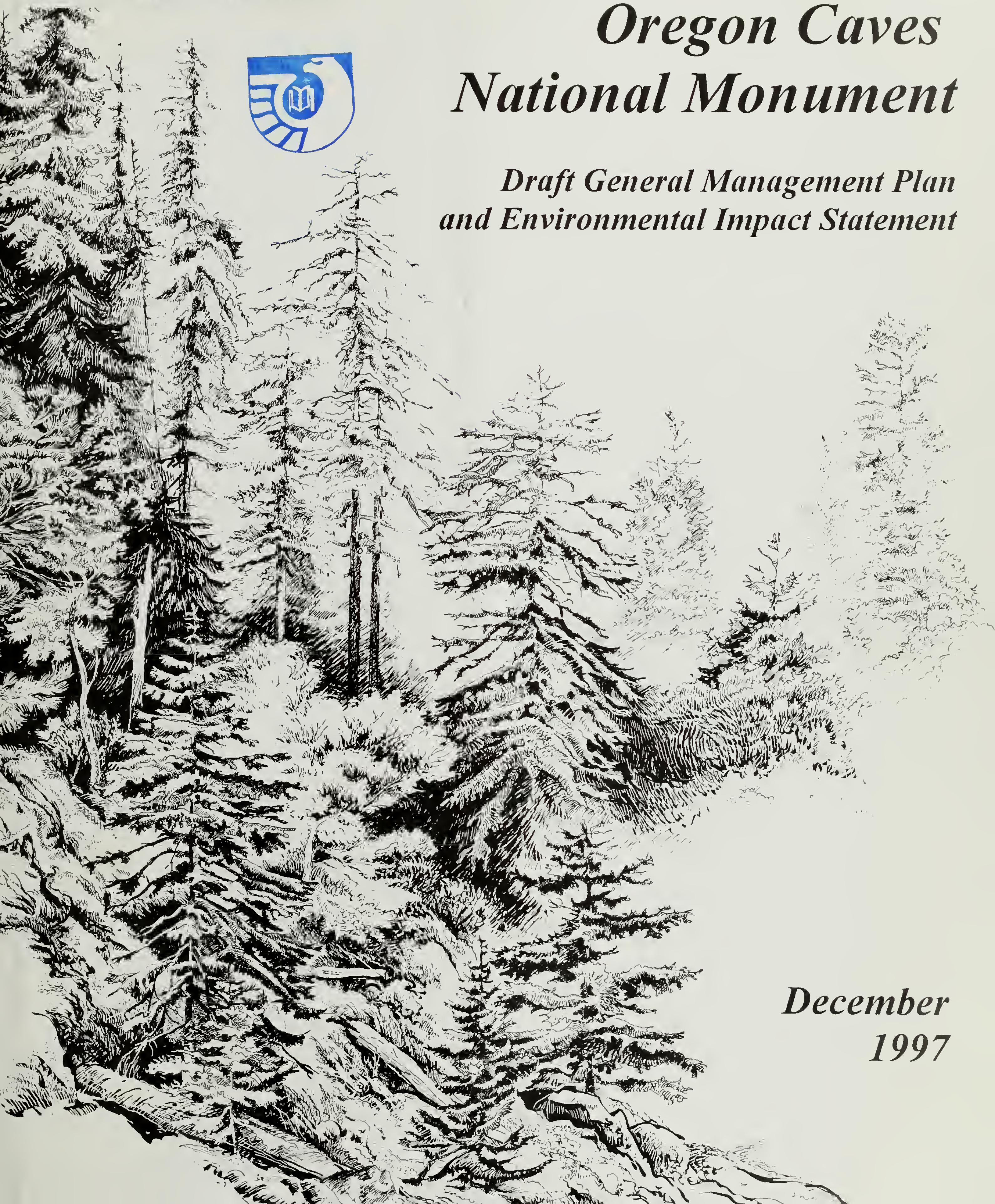
Oregon Caves National Monument

Draft General Management Plan and Environmental Impact Statement



December 1997

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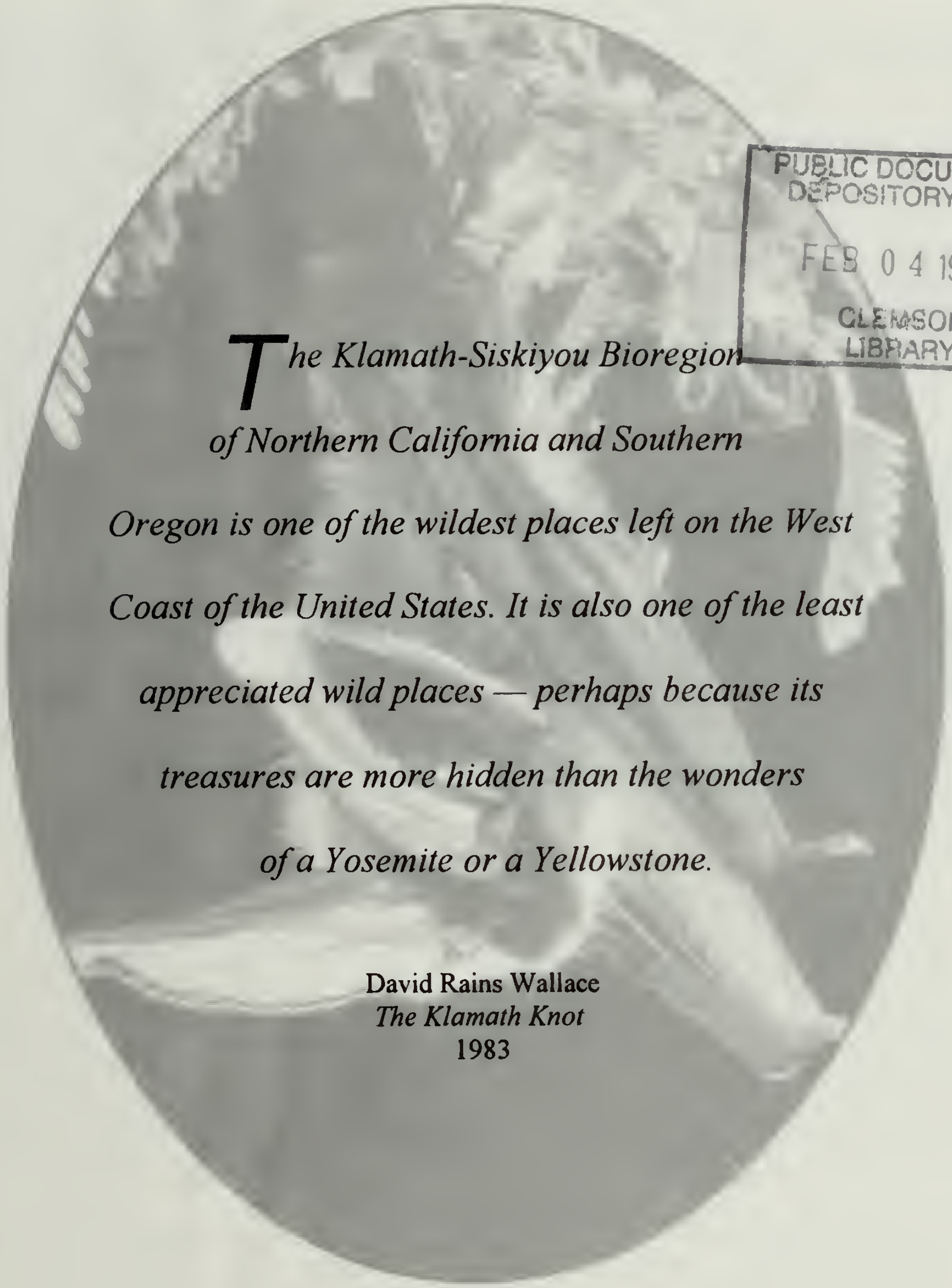


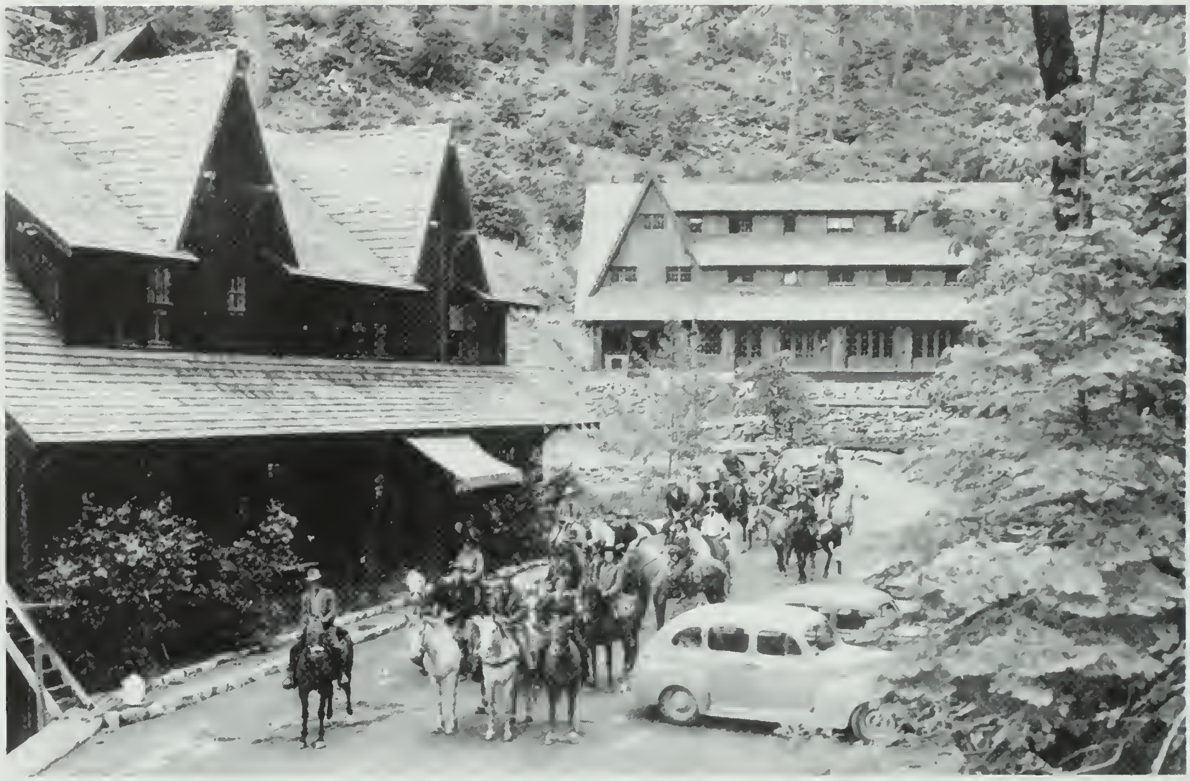
The Klamath-Siskiyou Bioregion of Northern California and Southern Oregon is one of the wildest places left on the West Coast of the United States. It is also one of the least appreciated wild places — perhaps because its treasures are more hidden than the wonders of a Yosemite or a Yellowstone.

David Rains Wallace
The Klamath Knot
1983

Townsend's Big-eared Bat
(*Plecotus townsendii*)

98-0116-P

Townsend's Big-earred Bat
(*Plecotus townsendii*)



This historic photo shows the Oregon Caves Chateau pictured on the left and the Chalet at center.

Draft General Management Plan
Draft Development Concept Plans
Draft Environmental Impact Statement

for

Oregon Caves National Monument

Prepared by
U.S. Department of the Interior
National Park Service

Four alternatives have been examined in this draft *Oregon Caves National Monument General Management Plan and Environmental Impact Statement*. They respond to both National Park Service planning requirements and to the issues identified during the scoping process. The alternatives are characterized as follows: 1) Alternative A is the "No Action Alternative" which means a continuation of the present course of action, or maintenance of the status quo of existing policies and programs; 2) Alternative B is the "Minimum Requirements Alternative" and describes those minimum actions, consistent with the purpose of the park, that are required for the safe and effective operation of the park; 3) Alternative C is the proposed action and "Preferred Alternative;" it emphasizes enhanced protection of the Monument resources and visitor experiences; and 4) Alternative D emphasizes increased visitor services and recreation opportunities combined with increased watershed protection.

These alternatives address visitor use and the preservation of the natural and cultural resources that provide the environment in which the Oregon Caves story is presented to the public. One of these alternatives, Alternative C, constitutes the proposed action and the Preferred Alternative of the National Park Service and, if approved, will become the general management plan for the Monument.

The proposed action enhances visitor experiences through park ranger-led tours of the cave, development of an on-site visitor center through the adaptive reuse of an existing historic property, establishment of a cave tour reservation system, and enhancement of a system of non-motorized trails in a protected forest setting. The proposed action also provides for increased protection of the Monument`s cave hydrology, surface forest environment and public water supply through a proposed 3,310 acre addition to the Monument. This would be accomplished through a transfer of Siskiyou National Forest land to the National Park Service. Legislation would be required to implement this aspect of the proposal. In addition, the draft general management plan and environmental impact statement contains two development concept plans: 1) Administrative Site Development Concept Plan, and 2) Parking and Entry Area Development Concept Plan.

The environmental consequences of the proposed action and other alternatives are fully disclosed in the environmental impact statement. Also included are the results of initial public involvement, and consultation and coordination. For further information contact the Superintendent, Oregon Caves National Monument, 19000 Caves Highway, Cave Junction, Oregon; telephone: (541) 592-2100.

Written comments concerning this draft general management plan and environmental impact statement should be sent to the Superintendent at the above address by March 13, 1998.

Summary

This document is a draft general management plan and environmental impact statement for Oregon Caves National Monument. The plan provides National Park Service management with the necessary framework to guide the management of the Monument for the next 15 years. The plan is intended to be a useful long-term decision-making tool, providing National Park Service managers with a logical and trackable rationale for decisions about the protection and public use of Monument resources.

In 1907, four sections of land, encompassing approximately 2,560 acres were withdrawn for study for the purposes of establishing the Monument. Two years later, a 480 acre Monument was established by proclamation of President William H. Taft. In 1978, eight additional acres were arthorized in the community of Cave Junction for purposes of developing a visitor information center. Only four were added to the Monument, bringing the total Monument acreage to 484 acres. The Monument also utilizes an 80 acre administrative site within the Siskiyou National Forest which is provided to the National Park Service under interagency agreement with the U.S. Forest Service.

At the beginning of the planning process, a series of public scoping meetings were held to present the purpose and significance of the Monument to the public, to outline Monument mission goals, and to present issues that will be addressed in the plan. Input was solicited from the public and other governmental agencies to discern if there were other issues that needed to be addressed in the plan which were not initially listed. Among the issues brought up during the public scoping process were the protection of cave ecology and surrounding forest resources, the protection of area watersheds and the public water supply, the adequacy of the existing boundary to protect resources, the current manner of interpretation of the cave to the public, and the adequacy of present visitor services and facilities.

In response to these issues, and cognizant of the mission goals established for the Monument, the draft general management plan provides four alternative approaches for the protection, public use and management of Monument resources.

Alternative A is the "No Action Alternative." Alternative A would involve a continuation of existing conditions, including retention of concession-contracted services for cave tours, lodging, food service and gift sales. No boundary change would be included under Alternative A, and no change to current administrative facilities would be forthcoming. The Monument would continue to be open to cave tours year-round.

Alternative B serves as the "Minimum Requirements Alternative" to initiate those minimum actions necessary to protect the natural and cultural resources of the Monument and protect the health and safety of the public. Included in Alternative B would be development of adequate administrative and collection storage in the Chateau. Cave tours would be operated with National Park Service interpretive guides under this alternative, and a cave tour reservation system would be established and based at the Illinois Valley Visitor Center. Under Alternative B, protection would be provided to the Lake Creek and upper Cave Creek watersheds, the public water supply, and foreground and middleground viewsheds as seen from the Monument through the delineation of a 3,310 acre protected area within the Siskiyou National Forest under cooperative agreement with the National Park Service. The cave would be open to public use from mid-March to early December under this alternative. However, no concession lodging, dining or gift sales would be provided at the Monument under this alternative. The lower level of the Chalet would be used for an on-site Monument visitor center.

Alternative C constitutes the "Preferred Alternative." Alternative C would provide adequate administrative and collection storage at the administrative site. As with Alternative B, cave tours would be operated with National Park Service interpretive rangers under this alternative and a cave tour reservation system would be established and based at the Illinois Valley Visitor Center, which would continue to serve as a key point for initial visitor contact and information. Under Alternative C, protection would be provided to the Lake Creek and upper Cave Creek watersheds, the public water supply, and foreground and middleground viewsheds as seen from the Monument through the transfer of 3,310 acres to the Monument from the Siskiyou National Forest. Additional hiking and other recreational opportunities would be provided to the public, and public vehicular access would be maintained to adjacent national forest lands. The cave would be open to public use from mid-March to early December under this alternative. Concession provided lodging, food service and gift sales would continue under this alternative, and would be located at the Chateau. The use of the lower level of the Chalet would be converted from the current concession operated gift shop to the Monument visitor center and staffed with National Park Service and cooperating association employees.

Alternative D develops a new on-site visitor center which would provide interpretative services to the public. Concession lodging, food service and gift sales operations are retained at the Chateau and Chalet respectively. The cave would be open to the public on a year-round basis, and cave tours would be conducted by a non-profit institute or similar association under this alternative. Like Alternative C, Alternative D would provide adequate administrative and collection storage at the administrative site, and the Illinois Valley Visitor Center would be used for initial visitor orientation, visitor contact, and cave tour reservations. Protection of the Lake Creek and upper Cave Creek watersheds, the public water supply and foreground viewshed would be accomplished through a transfer of 2,373 acres to the Monument from the Siskiyou National Forest. In addition, protection of portions of the middleground viewshed would be accomplished by the establishment of a 937 acre protected area within the Siskiyou National Forest through a cooperative agreement between the National Park Service and U.S. Forest Service.

Actions common to all alternatives include the continued rehabilitation of the cave trail, the continued use of the Illinois Valley Visitor Center for visitor orientation and information, protection of the Oregon Caves Historic District, and ongoing regional cooperation on various issues such as fire management and tourism.

A summary chart of actions for each alternative is included in the document.

NATIONAL PARK SERVICE
OREGON
CAVES
NATIONAL
MONUMENT
DEPARTMENT OF INTERIOR

Table of Contents

Chapter 1: Background of the Park 1

Background 1
- Discovery of Oregon Caves 1
- Establishment of Oregon Caves National Monument 1
- Actions Affecting Oregon Caves National Monument After Proclamation 2

Purpose and Significance of Monument 4
- Purpose of Monument 4
- Significance of Monument 4

Monument Mission Goals 5

Chapter 2: Purpose and Need for the Plan 7

Planning Issues and Concerns 7
- Protection of Cave Resources 7
- Protection of Water Resources 8
- Relationship of Forest Ecology to Cave Ecology 8
- Adequacy of Existing Boundary 8
- Protection of Viewshed 9
- Management and Maintenance of Surface Trail System 9
- Protection of Threatened and Endangered Species 9
- Maintenance and Use of Cultural Resources and Visitor Facilities 9
- Interpretation of Cave 10
- Management and Control of Fire 10
- Development and Maintenance of Stronger Ties with Siskiyou National Forest 10
- Restoration of Cave and Rehabilitation of Cave Trail and Lighting System 10
- Appropriate Use of the Illinois Valley Visitor Center 11
- Enhancement of Visitor Services 11
- Adequacy of Administrative Support 11
- Adequacy of Cave Security Systems 11
- Development of Student Conservation Association and Student Intern Program 11

Chapter 3: Alternatives, Including the Proposed Action 13

Actions Common to All Alternatives 13

Alternative A—No Action Alternative 15
- General Description of Alternative A 15
- Management Zones 15
- Natural Resource Management 16
- Cultural Resource Management 16
- Interpretation and Visitor Use 16
- Recreation Resource Management 17

Scenic Resource Management 17
Park Facilities 1
Park Operations and Staffing 18
Fees 18
Concessions 18
Monument Hours and Seasons of Operation 19
Shuttle Systems 19
Parking, Access and Circulation 19
Monument Boundary 20
Opportunities for Regional Cooperation 20
Alternative B—Minimum Requirements Alternative 21
General Description of Alternative B 21
Management Zones 21
Natural Resource Management 22
Cultural Resource Management 22
Interpretation and Visitor Use 23
Recreation Resource Management 23
Scenic Resource Management 24
Park Facilities 24
Park Operations and Staffing 25
Fees 26
Concessions 26
Monument Hours and Seasons of Operation 26
Shuttle Systems 27
Parking, Access, and Circulation 27
Carrying Capacity 27
Monument Boundary 28
Opportunities for Regional Cooperation 29
Alternative C—the Preferred Alternative: Enhanced Protection of Monument Resources and Visitor Experiences 31
General Description of Alternative C 31
Management Zones 31
Natural Resource Management 32
Cultural Resource Management 33
Interpretation and Visitor Use 33
Recreation Resource Management 37
Scenic Resource Management 37
Park Facilities 38
Park Operations and Staffing 40
Fees 41
Concessions 41
Monument Hours and Seasons of Operation 42
Shuttle Systems 42
Parking, Access and Circulation 43
Carrying Capacity 43
Monument Boundary 46
Opportunities for Regional Cooperation 47

Alternative D—Increased Visitor Services and Recreation Opportunities Combined With Increased Watershed Protection 49
- General Description of Alternative D 49
- Management Zones 50
- Natural Resource Management 50
- Cultural Resource Management 51
- Interpretation and Visitor Use 51
- Recreation Resource Management 52
- Scenic Resource Management 53
- Park Facilities 54
- Park Operations and Staffing 55
- Fees 56
- Concessions 56
- Monument Hours and Seasons of Operation 57
- Shuttle Systems 57
- Parking, Access and Circulation 57
- Carrying Capacity 58
- Monument Boundary 59
- Opportunities for Regional Cooperation 60

Actions Considered but Rejected 61
Summary of Actions for Each Alternative 63

Chapter 4: The Affected Environment 67

The Natural Environment 67
- Geologic Setting 67
- Physiography and Climate 68
- Cave Resources 68
- Soils 70
- Water Resources 70
- Vegetation 76
- Wildlife 78
- Air Quality 80
- Fire 81

The Cultural Environment 82
- Cultural Context 82
- Archeological Resources 84
- Tribal Interests 85
- Historic Resources and Cultural Landscapes 86
- Collections 87

Interpretation 88
- Interpretive Themes 88
- Issues Related to Interpretation 89

Visitor Use 92
- Visitor Use Patterns 92
- Visitor Characteristics 94

- Carrying Capacity **94**
- **Socioeconomic Factors 95**
  - Regional Setting **95**
  - Location and Access **97**
  - Land Use and Ownership Patterns **101**
    - Land Use Documents **103**
    - Adjacent Land Use **105**
- **Recreational Resources 110**
  - Historic Overview **110**
  - Trails **111**
  - Picnic Areas **111**
  - Campgrounds **111**
- **Scenic Resources 112**
  - Visual Analysis **113**
- **Existing Park Development and Programs 116**
  - Roads and Parking **116**
  - Trails **116**
  - Buildings and Facilities **119**
  - Utility Systems **121**
- **Concessions 123**
  - Background **123**
  - Current Status of Concession Operations and Other Visitor Services **125**

Chapter 5: Environmental Consequences 131

- **Effects Common to All Alternatives 131**
- **Alternative A—No Action Alternative 133**
  - Effects on Natural Resources Under Alternative A **133**
  - Effects on Cultural Resources Under Alternative A **134**
  - Effects on Scenic Resources Under Alternative A **134**
  - Effects on Visitor Use/Interpretation Under Alternative A **135**
  - Effects on Park Facilities/Staffing/Operations Under Alternative A **135**
  - Effects on Socioeconomic Factors Under Alternative A **136**
  - Effects of Boundary Adjustment/Land Protection Under Alternative A **136**
  - Cumulative Impacts Under Alternative A **137**
  - Unavoidable Adverse Impacts Under Alternative A **138**
  - Short-Term Use vs. Long-Term Productivity Under Alternative A **138**
  - Irreversible or Irretrievable Resource Commitments Under Alternative A **138**
- **Alternative B—Minimum Requirements Alternative 139**
  - Effects on Natural Resources Under Alternative B **139**
  - Effects on Cultural Resources Under Alternative B **141**
  - Effects on Scenic Resources Under Alternative B **141**
  - Effects on Visitor Use/Interpretation Under Alternative B **142**
  - Effects on Park Facilities/Staffing/Operations Under Alternative B **143**
  - Effects on Socioeconomic Factors Under Alternative B **144**
  - Effects of Boundary Adjustment/Land Protection Under Alternative B **145**
  - Cumulative Impacts Under Alternative B **146**

    Unavoidable Adverse Impacts Under Alternative B 146
    Short-Term Use vs. Long-Term Productivity Under Alternative B 146
    Irreversible or Irretrievable Resource Commitments Under Alternative B 146
Alternative C—the Preferred Alternative: Enhanced Protection of Monument Resources and Visitor Experiences 147
    Effects on Natural Resources Under Alternative C 147
    Effects on Cultural Resources Under Alternative C 149
    Effects on Scenic Resources Under Alternative C 149
    Effects on Visitor Use/Interpretation Under Alternative C 150
    Effects on Park Facilities/Staffing/Operations Under Alternative C 152
    Effects on Socioeconomic Factors Under Alternative C 152
    Effects of Boundary Adjustment/Land Protection Under Alternative C 154
    Cumulative Impacts Under Alternative C 154
    Unavoidable Adverse Impacts Under Alternative C 155
    Short-Term Use vs. Long-Term Productivity Under Alternative C 155
    Irreversible or Irretrievable Resource Commitments Under Alternative C 155
Alternative D—Increased Visitor Services and Recreation Opportunities Combined With Watershed Protection 157
    Effects on Natural Resources Under Alternative D 157
    Effects on Cultural Resources Under Alternative D 159
    Effects on Scenic Resources Under Alternative D 159
    Effects on Visitor Use/Interpretation Under Alternative D 160
    Effects on Park Facilities/Staffing/Operations Under Alternative D 160
    Effects on Socioeconomic Factors Under Alternative D 161
    Effects of Boundary Adjustment/Land Protection Under Alternative D 162
    Cumulative Impacts Under Alternative D 163
    Unavoidable Adverse Impacts Under Alternative D 164
    Short-Term Use vs. Long-Term Productivity Under Alternative D 164
    Irreversible or Irretrievable Resource Commitments Under Alternative D 164

Chapter 6: Summary of Public Involvement 165

Scoping Meetings 165

Chapter 7: List of Preparers and Cooperating Entities 167

Planning Team Composition and Functions 167
Consultants 168
Other Cooperating Entities 170

Chapter 8: List of Agencies, Organizations and Persons to Whom Copies of the GMP/EIS Were Sent 173

Federal Agencies and Officials 173
State and Local Agencies and Officials 174
Tribes 174

Organizations 174
Business/Industry 175
Schools/Libraries/Institutions 175
Media 176

Chapter 9: Appendices 177

Appendix A: Oregon Caves National Monument Proclamation/1978 Boundary Change 178
Appendix B: National Park Service Mission Goals 181
Appendix C: Letter, Section 7 Consultation with U.S. Fish and Wildlife Service, Endangered Species Act 183
Appendix D: Letters, 106 Compliance with Oregon State Historic Preservation Officer and Advisory Council on Historic Preservation 188
Appendix E: Pretinent Laws, Policies, and Procedures 191
Appendix F: Analysis of Boundary Adjustment and Land Protection Criteria 196
Appendix G: Supplemental Bibliography 202
Appendix H: Acronyms/Glossary 208

Chapter 10: Bibliography 221

Chapter 11: Index 225

List of Figures

(Figures are located after the following page numbers.)

Chapter 1

Figure 1, Greater Siskiyou Ecoregion **2**
Figure 2, Withdrawal and Status of Oregon Caves National Monument **2**
Figure 3, Physical Features **6**

Chapter 2

Figure 4, Natural Features **8**

Chapter 3

Figure 5, Boundary Modifications: Alternative A **20**
Figure 6, Boundary Modifications: Alternative B **28**
Figure 7, Development Concept Plan: Administration Site **38**
Figure 8, Development Concept Plan: Parking and Entry Area **44**
Figure 9, Boundary Modifications: Alternative C **46**
Figure 10, Watershed Resources **48**
Figure 11, Boundary Modifications: Alternative D **60**

Chapter 4

Figure 12, Geology **68**
Figure 13, Concentrated Allogenic Recharge **72**
Figure 14, Oregon Caves Dye Traces **72**
Figure 15, Vegetative Associations **76**
Figure 16, Oregon Caves Historic District **86**
Figure 17, Siskiyou National Forest Management Zones **106**
Figure 18, Timber Harvest Areas Since 1994 **108**
Figure 19, Oregon Caves Highway Visitor Experience **112**
Figure 20, Viewpoints: Level I and II **114**
Figure 21, Viewshed 1 **114**
Figure 22, Viewshed 2 **114**
Figure 23, Viewshed 3 **114**
Figure 24, Viewshed 4 **114**
Figure 25, Viewshed 5 **114**
Figure 26, Viewshed 6 **114**
Figure 27, Viewshed 7 **114**
Figure 28, Viewshed 8 **114**
Figure 29, Viewshed 9 **114**
Figure 30, Viewshed 10 **114**
Figure 31, Viewshed 11a **114**
Figure 32, Viewshed 11b **114**
Figure 33, Viewshed 12 **114**
Figure 34, Composite Viewshed Level I, Viewpoints: Foreground **114**
Figure 35, Composite Viewshed Level I, Viewpoints: Middleground **114**
Figure 36, Composite Viewshed Level II, Viewpoints: Foreground **114**
Figure 37, Composite Viewshed Level II, Viewpoints: Middleground **114**

Silky Balsamroot
(Balsamorhiza sericea)

Background of the Park

Background of the Park

Oregon Caves National Monument (Monument) is located within the Siskiyou Mountains of southern Oregon in Josephine County, about 20 miles east from its gateway community of Cave Junction. The Monument is accessed at the terminus of State Highway 46 (Caves Highway). The California-Oregon border is seven miles to the south and the Pacific Ocean lies 40 miles to the west. The Monument is situated within Oregon's Second Congressional District. (See Figure 1, Greater Siskiyou Ecoregion.)

Background

Discovery of Oregon Caves

Elijah Davidson and his dog, Bruno, were hunting in 1874 when Bruno chased a bear into a dark hole in the side of a mountain. Davidson followed to rescue his dog, and in doing so, discovered Oregon Caves. After all his matches were exhausted, he was able to find his way out of the cave—with his dog—by following the sound of the creek which flowed in the passageway.

In 1904, Joaquin Miller toured the cave with other visitors and was impressed. Miller, a well-known poet and writer, publicly referred to the cave as the "Marble Halls of Oregon." In 1915, in his book of poetry, *Song of the Sierras* (Volume Two), he wrote the following reference to the cave (Miller 1915: p.210):

> The next great wonder of our undiscovered Oregon is still less known to the world and almost entirely unknown to ourselves. This is the great Marble Halls of Oregon; a cavern, greater, so far as yet known, than the great Mammoth Cave of Kentucky. Its existence was first known only a few years back and, to this hour, has been explored for the depth of but a few miles.

Miller and others helped promote the caves to the national public. Attention about the caves grew which led to the establishment of Oregon Caves National Monument.

Establishment of Oregon Caves National Monument

On August 12, 1907, by order of the Secretary of the Interior, Sections 9, 10, 15, and 16 of unsurveyed Township 40 S., Range 6 W. (Willamette Meridian), Oregon, were withdrawn from operation under the public land laws, including mineral entry, for the purpose of establishing a proposed national monument. This withdrawal totaled approximately 2,560 acres. (See Figure 2, Withdrawals and Status of Oregon Caves National Monument.)

On July 12, 1909, President William H. Taft signed a proclamation [No.876—July 12, 1909—36 Stat. 2497] establishing Oregon Caves as a national monument within the Siskiyou National Forest (SNF), to be administered by the United States Forest Service (USFS). The proclamation states:

> The reservation made by this proclamation is not intended to prevent the use of the lands for National Forest purposes under the proclamations and Executive Order establishing the Siskiyou National Forest, but the two reservations shall both be effective on the land withdrawn, but the National Monument hereby established shall be the dominant reservation and any use of the land which interferes with its

> preservation or protection as a National Monument is hereby forbidden.

The lands referred to in the proclamation, the existing Monument, covers only 480 acres compared with the 2,560 acres originally included in the 1907 withdrawal. (The total acreage for the Monument today is 484 due to the addition of four acres for the Illinois Valley Visitor Center in 1978.) (See Appendix A, Proclamation for Establishment of Oregon Caves National Monument.)

Today, the 1907 withdrawal remains—2,080 acres surrounding the Monument—and precludes mining, but not mineral leasing or timber harvest. This withdrawal outside the 1909 proclamation is administered by the USFS as a part of the SNF.

Actions Affecting Oregon Caves National Monument After Proclamation

The Oregon Caves Highway was completed in 1922 allowing for easier access into the rugged topography and providing for increased visitation to the caves.

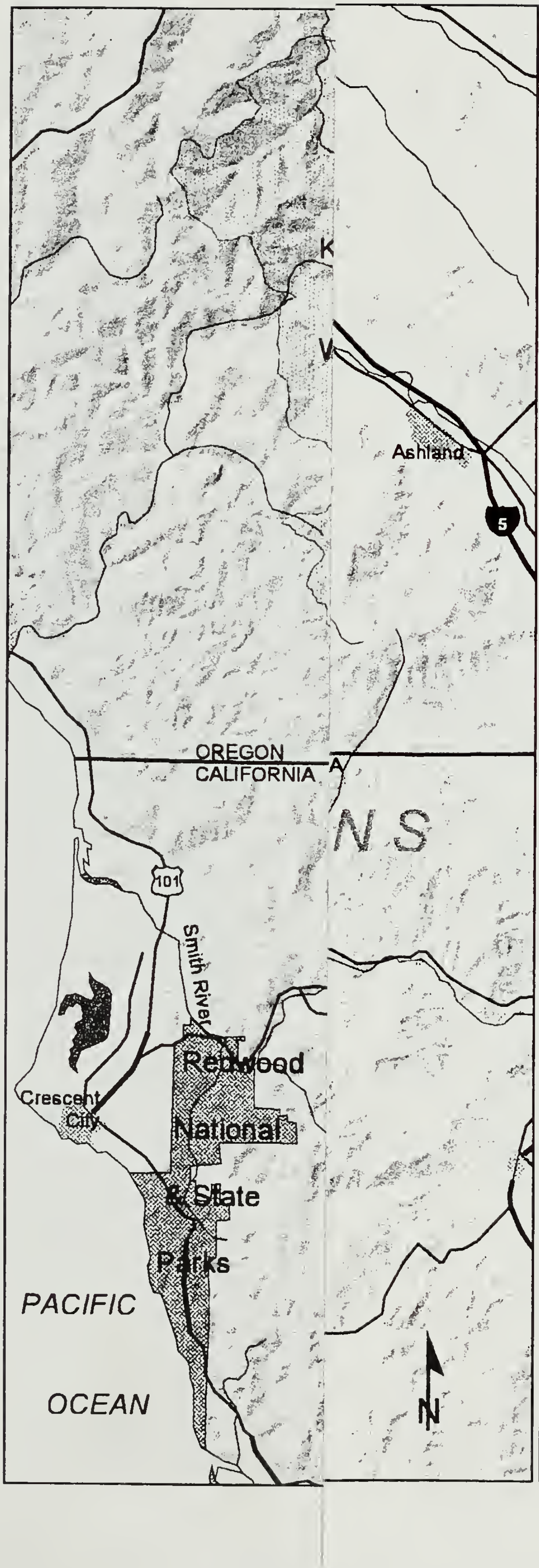
In 1923, local businessmen applied for a permit to build a resort at Oregon Caves. The Chalet was built in the rustic architecture style using Port Orford cedar bark as sheathing. Other buildings were soon constructed, including the Chateau.

Executive Order 6166 was signed transferring the administration of the Monument to the National Park Service (NPS) from the USFS on July 10, 1933.

In August 1939, a report was prepared by Monument staff for the Regional Director on recommending extensions to Oregon Caves National Monument. The recommendations included extending the boundary an additional 2400 acres raising the total area of the Monument to 2880 acres. The extension was based on the following reasons: to conserve the upper Lake Creek watershed and water supply for Monument use, to provide greater recreational opportunities such as hiking and horseback riding, and to protect the geological and botanical features, and views of the rugged Siskiyou Mountains.

Ten years later, in August 1949, a boundary extension of over 4,500 acres was recommended for the Monument by the Oregon Caves Boundary Study Committee, represented by the USFS, Bureau of Land Management (BLM), and the NPS. Included in that document was a Memorandum for the NPS Regional Director, Region Four, San Francisco stating:

> In 1936 an extension of Oregon Caves National Monument would have been highly desirable and far-sighted; in 1949 it has become urgent. So great have been the changes in the economic and physical aspects of the land that the present opportunity to carry out what was proposed twelve years ago probably represents the last chance. Since the war the number of lumber mills in the vicinity has increased tenfold. Logging destruction of the surrounding forest in the last three years has been enormous. Cutting already has approached to within a half mile of the Monument.
>
> The issue transcends considerations merely of making Oregon Caves National Monument a more attractive area. At the rate the face of the land is changing now, in thirty years (probably less) this area, if saved now, will be an outstandingly beautiful remnant of a unique mountain forest region that elsewhere will have largely vanished forever.



ORCA GMP/EIS

FIGURE 1

Greater Siskiyou Ecoregion

Legend

▆ National Monument

▩ National Park

⬚ Wilderness

▨ City

/\/ State Boundary

/\/ Divided Highway

/\/ Highway

0 Kilometers 10

0 Miles 10

Data Sources:
ESRI Digital Chart of the World: hydrography, roads
The Wilderness Society: wilderness boundaries
USGS: topography, park boundaries

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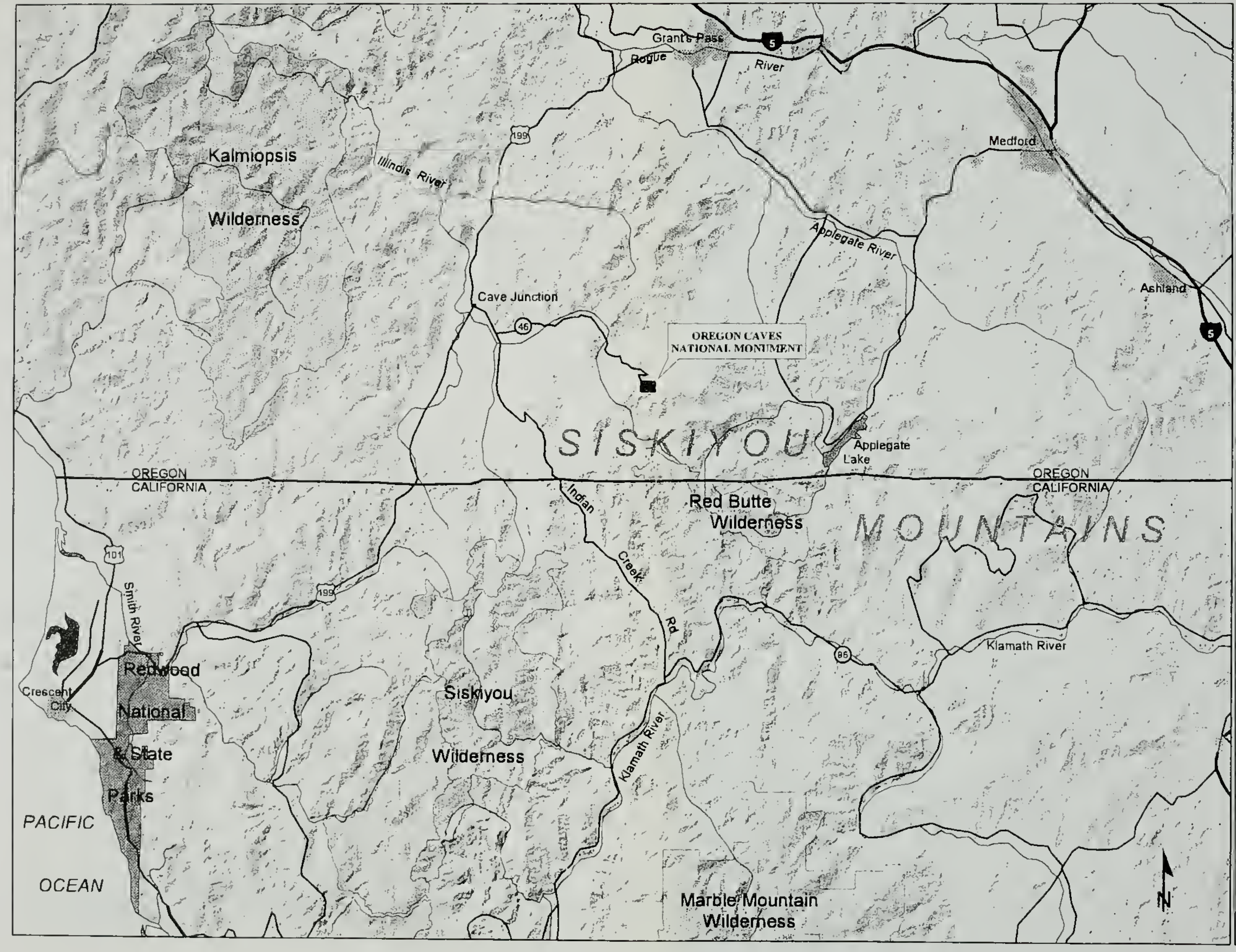
Ecoregion

ORCA GMP/EIS

FIGURE 1
Greater Siskiyou Ecoregion



Legend

Data Sources
ESRI Digital Chart of the World: hydrography, roads
The Wilderness Society: wilderness boundaries
USGS: topography, park boundaries

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Ecoregion

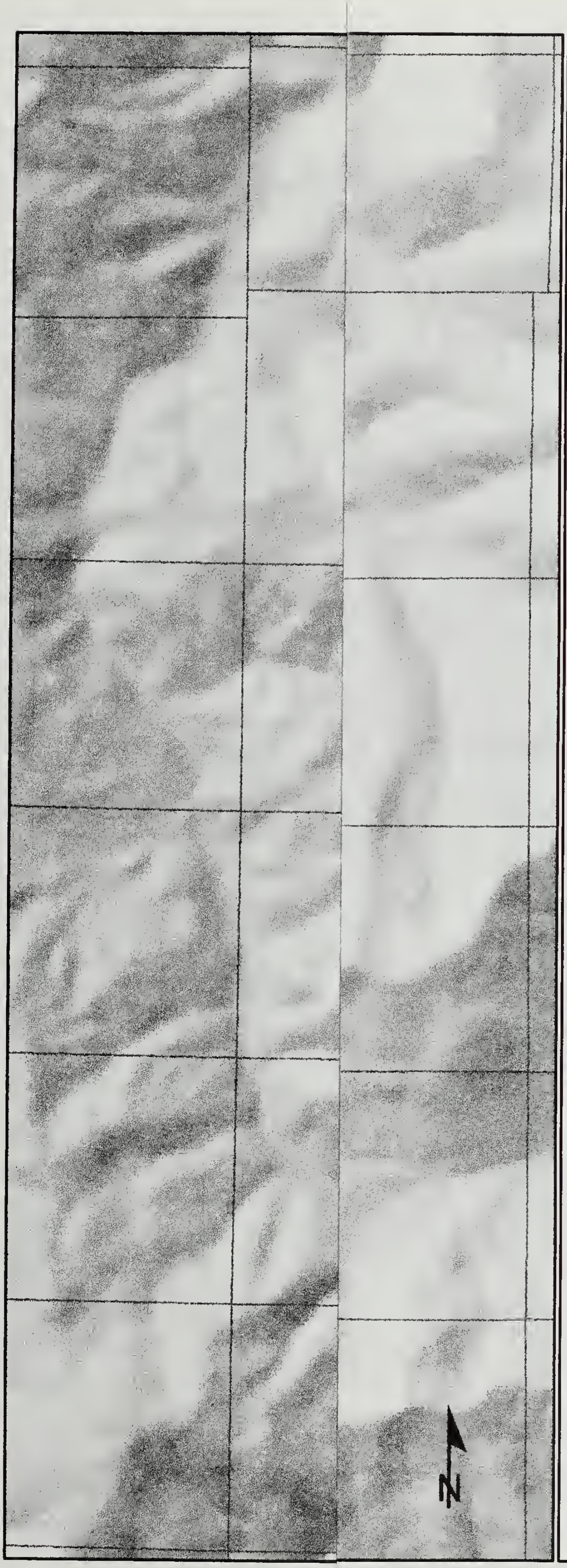

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FIGURE 2

Withdrawal & Status of Oregon Caves National Monument

Legend

- ▨ Withdrawal (40 acres) made by Public Land Order No. 5226 of July 14, 1972
- ▨ Withdrawal (2560 acres) made by the Secretarial Order of August 12, 1907
- ▨ Oregon Caves National Monument (480 acres) Withdrawn by Presidential Proclamation No. 876 of July 12, 1909
- ▨ Memorandum of Understanding NPS Administrative site (80 acres) within withdrawal by Secretarial Order of August 12, 1907
- ☐ Public Land Survey System Section Lines

0 Kilometers 1

0 Miles 1

Data Sources:
SISKIYOU NF: PLSS
USGS: topography, park boundary
NPS: administrative site boundary, withdrawal boundary

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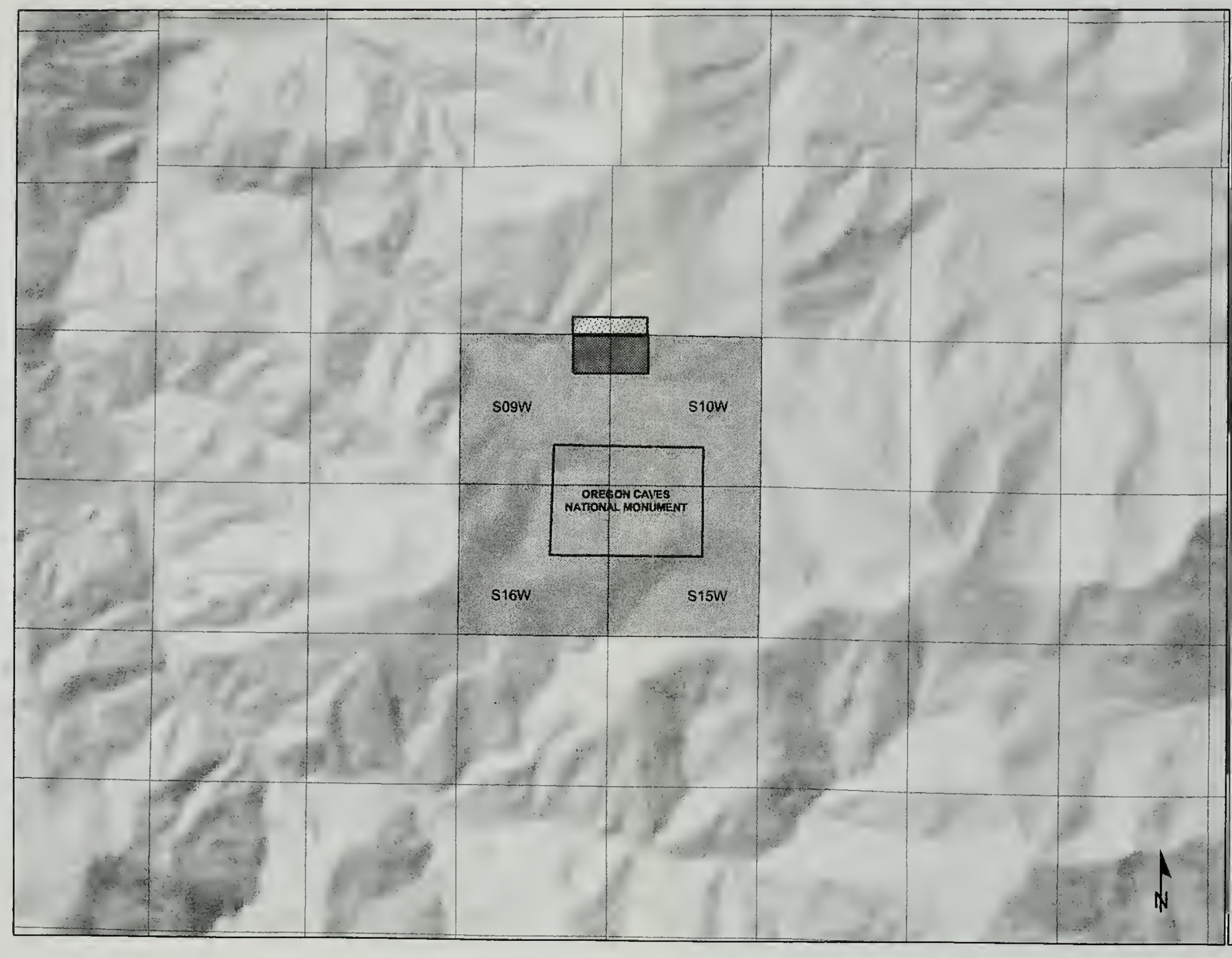
Withdrawal

ORCA GMP/EIS



S09W
S10W
OREGON CAVES NATIONAL MONUMENT
S16W
S15W
N

FIGURE 2

Withdrawal & Status of Oregon Caves National Monument

Legend
▨ Withdrawal (40 acres) made by Public Land Order No. 5226 of July 14, 1972
▨ Withdrawal (2560 acres) made by the Secretarial Order of August 12, 1907
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☐ Public Land Survey System Section Lines
0 Kilometers 1
0 Miles 1

Data Sources:
SISKIYOU NF: PLSS
USGS: topography, park boundary
NPS: administrative site boundary, withdrawal boundary

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Withdrawal

Mentioned by the committee's report were stands of Port Orford cedar to be included in the adjusted boundary. The cedar stands were outstanding examples in southwest Oregon with only a few left in the world. The boundary expansion did not occur and the Port Orford cedar stands were cut.

On July 20, 1972 an Administrative Site Withdrawal (Public Land Order 5226) was designated outside of the original four section withdrawal to protect a potable water source for NPS at the administrative site on USFS land. The area described contains 40 acres in Josephine County (Township 40 S., Range 6 W., Section 3, S 1/2 SW 1/4 SW 1/4; Section 4, S 1/2 SE 1/4 SE 1/4). The withdrawal states:

> The withdrawal made by this order does not alter the applicability of those public land laws governing the use of the national forest lands under lease, license, or permit, or governing the disposal of their mineral or vegetative resources other than under the mining laws. However, leases, licenses, or permits will be issued only if it is determined that such use will not interfere with the use of the land for the purposes for which they are withdrawn by this order.

These 40 acres are administered under the jurisdiction of the Department of Agriculture; however, the withdrawal is for the benefit of NPS.

On November 10, 1978, a boundary change (Public Law 95-625) authorized 7.98 acres in Cave Junction for the purpose of establishing an information/visitor center for Monument visitors. Construction for this proposed visitor center was never funded. However, in August 1990, construction of the Illinois Valley Visitor Information Center (IVVC) was completed under a challenge cost share agreement among the USFS, State of Oregon, Josephine County, City of Cave Junction, the Illinois Valley Chamber of Commerce, and Rough and Ready Lumber Company. The NPS entered into an interagency agreement with the SNF for operation and management of the center. The NPS administers 4.03 acres of this land. The remaining acreage (3.95 acres) was sold because the NPS determined that the need for a visitor center could be accomplished within the smaller, four acre parcel.

The Chateau was designated a National Historic Landmark (NHL) in 1987 because of its significance as an example of the rustic style of architecture. Later, in February 1992, the historic buildings within the Oregon Caves Historic District were listed on the National Register of Historic Places. This included the Chateau, Chalet, Guide Dormitory, Ranger Residence, and Checking and Comfort Station. Also included were the small scale features and plantings associated with the historic designed landscape.

USFS Special Use Agreements

A variety of agreements exist between the NPS and the USFS. Most noteworthy is the Memorandum of Understanding (MOU) that allows NPS facilities on USFS lands. Monument residence and maintenance facilities are situated on a portion of an authorized 80 acre tract of USFS land (approximately 40 acres are currently being used). The agreement allows for the use, improvement, and maintenance of buildings and associated utilities, as well as the construction and maintenance of additional facilities. The agreement has had several addenda that provide for telephone lines and a potable water supply and lines. A separate agreement covers VHF antennas on USFS land. The SNF assists the Monument with wildland fire efforts through a cooperative agreement. This agreement also allows NPS staff to respond to USFS fires that threaten the Monument and to provide response and assistance in a designated mutual aid area.

Purpose and Significance of Monument

Purpose of Monument

According to the NPS Organic Act of August 25, 1916, the NPS is to promote and regulate the use of park areas in conformance with their purpose which is:

> ...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The 1909 proclamation established the purpose of Oregon Caves National Monument. The proclamation states:

> Whereas, certain natural caves, known as the Oregon Caves, which are situated upon unsurveyed land within the Siskiyou National Forest in the State of Oregon, are of unusual scientific interest and importance, and it appears that the public interests will be promoted by reserving these caves with as much land as may be necessary for the proper protection thereof, as a National Monument; ...

Specifically, the primary purpose of the Monument is to preserve the environment of Oregon Caves as well as any new caves found within the boundaries of the Monument. Preservation includes management of old-growth forest and its associated species and natural processes within the watershed of the caves to assure that the chemistry of the water entering the cave is reflective of natural cycles associated with the region. Visitors to the Monument have an opportunity to tour through the cave and experience the twisted catacombs and cave formations created by water tables and aquifers of ancient watersheds while at the same time to observe the behavior of water under the conditions of the current ecosystem above and surrounding the caves. The caves are managed to preserve the collection of Pleistocene fossil bones and footprints as well as its endemic, cave dwelling life that is found there.

Significance of Monument

Oregon Caves is a 484 acre national monument within the Siskiyou Mountains. The Monument is significant for its representation of back-arc basin geology and its close association with a volcanically active oceanic rift zone. The limestone outcrop appears to have formed on this volcanically active sea mount as is evidenced by the presence of vesicular pillow basalt that sits directly beneath the marble outcrop and, in some cases, invades into the limestone demonstrating contemporary development of each. This is possibly the only cave system in the country with this type of geologic history and is one of the few marble caves in the nation available for public tours.

Recent discoveries indicate that this network of caverns possesses a significant collection of Pleistocene aged fossils, including jaguar and grizzly. (The Pleistocene lasted two million years, ending about 11,000 years ago, and included the most recent Ice Age.) In the summer of 1995, a jaguar skeleton and bones from a grizzly bear were discovered in the cave. Jaguar bones are scarce in North America. In addition, the skeleton, dated between 20,000 to 40,000 years old, may be the most intact prehistoric jaguar skeleton in existence. The grizzly bones, which are at least 50,000 years old, are the oldest known grizzly bones from either North or South America. These fossil remains contribute to making the Monument a nationally significant site for well preserved Pleistocene mammals.

Cave deposits are currently being examined for small vertebrate fossils, such as bats, rodents, and amphibians, that are representative of the region's fauna during the last Ice Age. These fossils, along with the recently discovered grizzly and mountain lion sized footprints in the vicinity, are likely to represent Pleistocene mammal activity which entered the cave by an opening that has since been sealed. The bones were preserved in the undisturbed confines of the cave environment for thousands of years.

A perennial stream, the River Styx, (the underground portion of Cave Creek) flows through the cave as one of the dynamic natural forces at work. Many hydrological processes occur in the cave and are visible here.

The cave ecosystem provides habitat for numerous plants and animals. Although not noted for large, cave-adapted animals, these caves do support some threatened species such as Townsend's big-eared bat and several cave-adapted insects endemic to the Monument.

The significance of the land surface above the cave cannot be overlooked. Many of the processes occurring within the cave are closely influenced by surface processes, especially through the exchange of air, water and food.

The Monument preserves an excellent example of the Siskiyou Mountain's primeval forest, an area with one of the highest percentages of endemic plants in the country. The native vegetation and fauna may become increasingly significant for scientific studies as the surrounding national forest land is logged for timber or utilized in other ways under multiple use management.

Five buildings and their associated landscape features and public use areas are listed in the National Register of Historic Places as an historic district. The centerpiece of the historic district is the Chateau, a National Historic Landmark. This unique six-story, cedar bark-sided building was built in 1934 and still operates today providing lodging and food service to Monument visitors. Other buildings in the National Register historic district include the Chalet, Guide Dormitory, Ranger Residence, and Checking and Comfort Station. (See Figure 3, Physical Features.) (Refer also to Figure 16, Oregon Caves Historic District.)

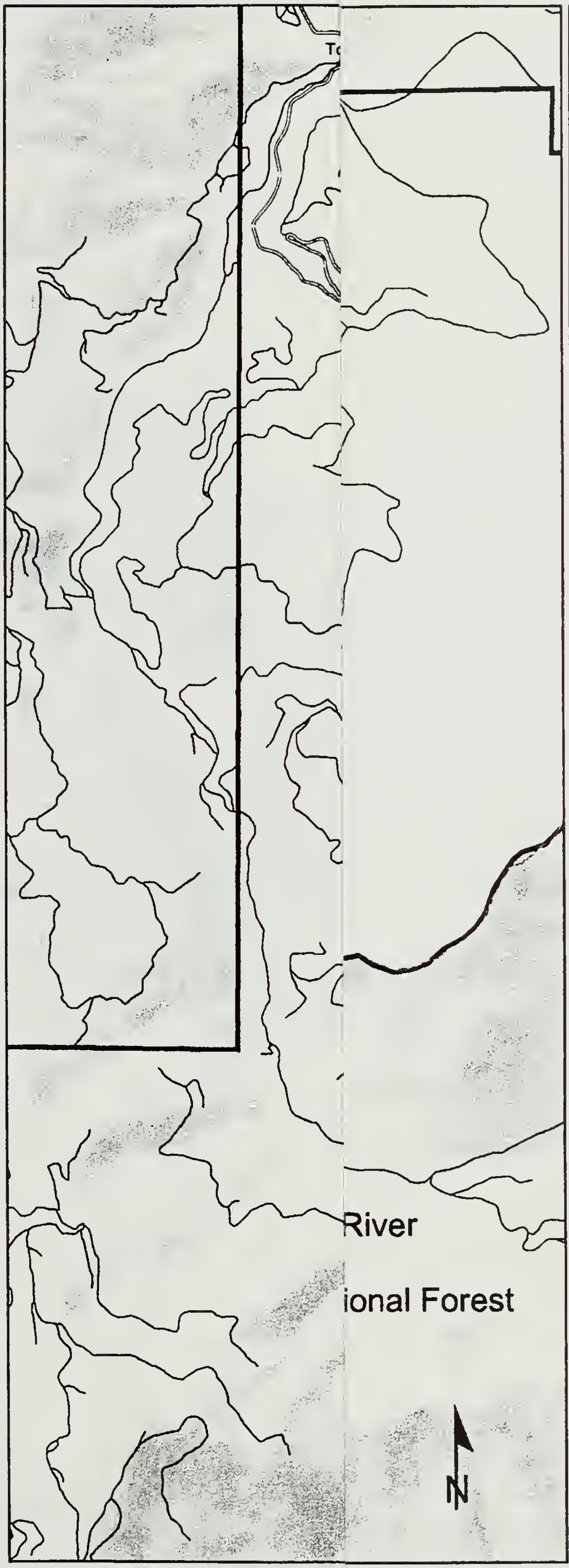
Monument Mission Goals

Mission goals describe the desired resource conditions and visitor experiences, that taken together, fully achieve the Monument's purpose, maintain its significance, and are consistent with NPS management policies. The relationship of Monument goals to servicewide goals contained in the *NPS Strategic Plan* is also noted. (See Appendix B for a summary of NPS Mission Goals.) Oregon Caves National Monument currently has seven mission goals:

- To protect Monument resources and the safety of its visitors through application of relevant laws, rules, and regulations. (Consistent with NPS Mission Goals Ia, IIa)
- To secure, through research and other means, adequate information to increase management efficiency and to ensure conservation of Monument resources. (Meets NPS Mission Goal Ib)
- To provide quality interpretive and visitor information services that increase the visitors' knowledge, appreciation and enjoyment of the resources at Oregon Caves National Monument. (Meets NPS Mission Goals IIa, IIb)
- To cooperate and interact with outside agencies, organizations and members of the public in assuring, to the extent possible, that nearby lands are developed, protected, and managed in ways that are compatible

with preserving the Monument's air and water quality, geological resources and ecological communities. (Meets NPS Mission Goals IIIa and IIIb)

- To provide the visiting public, through concession operated facilities, the highest quality of accommodations, food service, and visitor needs consistent with reasonable pricing and comparability with local businesses. (Meets NPS Mission Goal IIa)
- To develop and maintain facilities necessary for visitor use and Monument management at acceptable standards for health, safety, comfort and sustainability. (Meets NPS Mission Goals IIa and IVa)
- To restore the cave through mitigation of past and present human activities including rubble and trash removal, maintenance of natural air flow, and exotic plant control. (Consistent with NPS Mission Goals Ia and Ib)



ORCA GMP/EIS

FIGURE 3

Physical Features

Legend

- ▭ Park Boundary
- Waterline
- Trails
- Highway
- Other Roads
- ▲ Campground
- ■ Buildings

0 Kilometers 1
0 Miles 1

Data Sources:
Siskiyou NF: roads, forest boundaries
USGS: topography, park boundary
NPS: trails, waterline, buildings, campground

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Physical Features

ORCA GMP/EIS

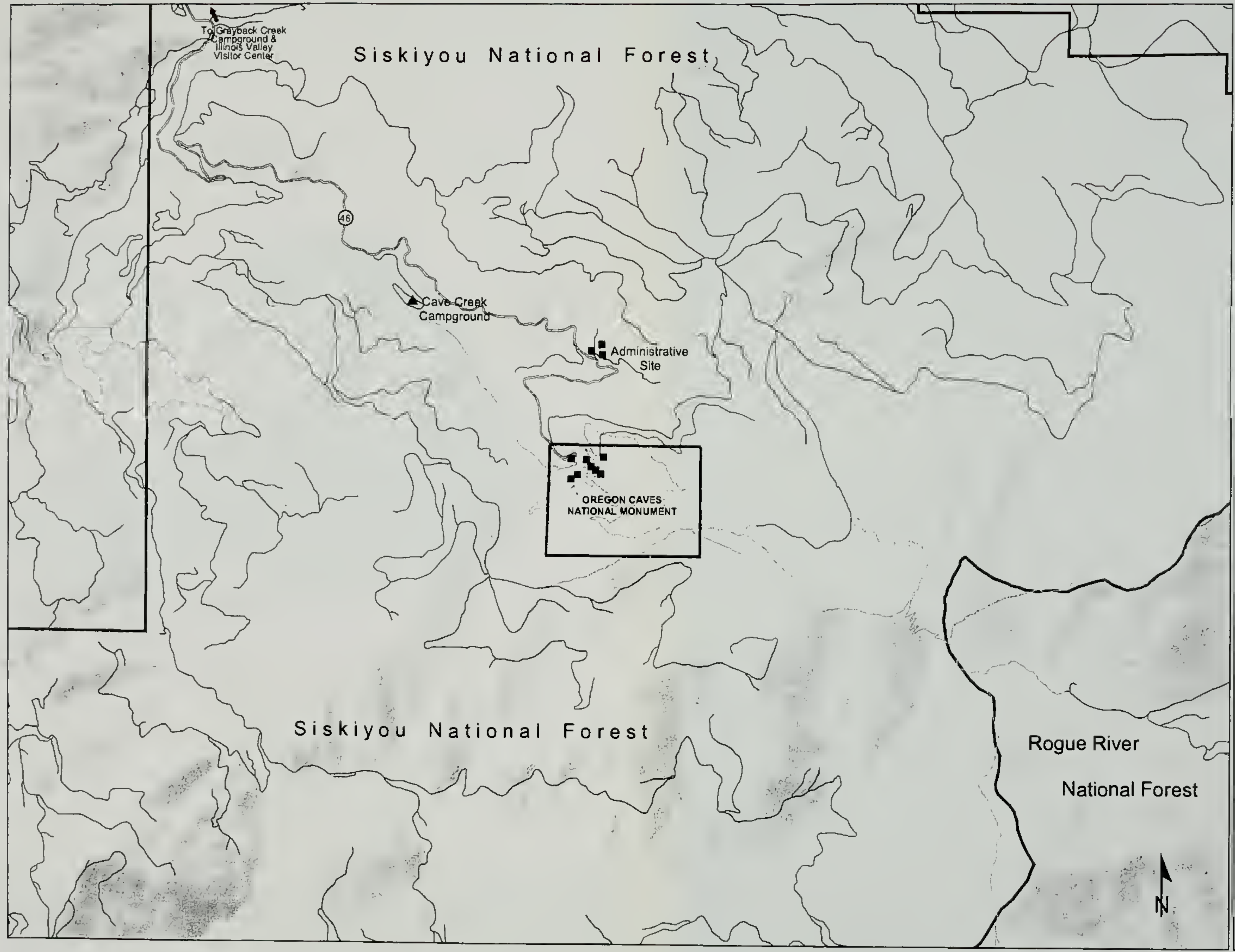

FIGURE 3
Physical Features

Data Sources:
Siskiyou NF; roads, forest boundaries
USGS. topography, park boundary
NPS: trails, waterline, buildings, campground

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Physical Features

American Marten
(*Martes americana*)

Purpose and Need for the Plan

Purpose and Need for the Plan

The purpose of this general management plan (GMP) and environmental impact statement (EIS) is to guide the management of natural and cultural resources and visitor services at Oregon Caves National Monument during the next 15 years. Successful implementation of the GMP would result in the preservation of natural and cultural resources and the enhancement of the quality of the visitors' experience.

Public Law 95-625, the National Parks and Recreation Act of 1978, requires the preparation and timely revision of general management plans for each unit of the national park system. The NPS management policies call for each GMP to "...set forth a management concept for the park [and] establish a role for the unit within the context of regional trends and plans for conservation, recreation, transportation, economic development, and other regional issues..." Congress has also specifically directed (16 U.S.C. 1a-7[b][4]) the NPS to consider, as part of the planning process, what modifications of external boundaries might be necessary to carry out park purposes and to protect park resources.

While it is the policy of the NPS to prepare or revise a GMP for units of the national park system every 15 years, the last comprehensive plan (Master Plan) for Oregon Caves National Monument was revised in 1975, 22 years ago. Many issues have changed since the last plan was written, or need to be reevaluated based upon new information or circumstances.

The draft plan proposed for implementation at the Monument reflects a range of alternatives which would provide for the future protection, management and public use of the Monument. A Preferred Alternative has been selected from a range of alternatives presented in the GMP/EIS.

Planning Issues and Concerns

Specific needs or problems to be addressed in this GMP/EIS are reflected in the following array of issues specific to the Monument. These issues were developed by NPS staff and the public through the public participation process. They are listed by category. For a more detailed description of these issues, refer to The Affected Environment chapter of this document.

Protection of Cave Resources

Cave resources are directly affected by water entering the cave. Surface water percolates through the soil, acquiring carbon dioxide from sources such as decaying plant material. This interaction forms a weak carbonic acid which dissolves calcium carbonate from the bedrock as it percolates downward. When this solution reaches the cave, the calcium carbonate is deposited, thus creating the formations inside the cave. Changes in the chemical and biological composition of the water can permit changes in the processes affecting the cave. Chemical changes in water entering the cave can be caused by altering the natural cycles (fire) or composition (logging) of the forest that exist within the watershed of the caves.

Visitor use can also have an impact on the cave resources. For example, visitors unintentionally carry organic matter into the cave on their shoes and clothing. Artificial lights in passageways cause algae to grow which would not otherwise be found in a cave environment. Visitors in the cave can negatively impact cave resources. The optimum number of cave tours and number of visitors in each tour needs to be addressed for both resource protection and visitor experience concerns.

Protection of Water Resources

Water quality is a major concern due to the significant ecological relationship that exists between the perennial stream, the River Styx, that flows through the cave and the surface environment. The recharge area, or source of the perennial stream that flows through the cave, comes in part from intermittent streams on the surface.

The Oregon Caves are located approximately 1,200 feet below the ridge of Mt. Elijah. All waters and whatever they are transporting cross jurisdictional boundary lines. (See Figure 4, Natural Features.) Two surface water sources used for the Monument's potable water supply are located on SNF land and are piped to the Monument and administrative site where it is treated at both locations. Actions affecting drainage in the national forest—upslope from the Monument—have the potential to impact the Monument. Activities such as mining, logging, grazing and stock use, and herbicide application on forest lands, have the potential for impact on the water resources within the Monument.

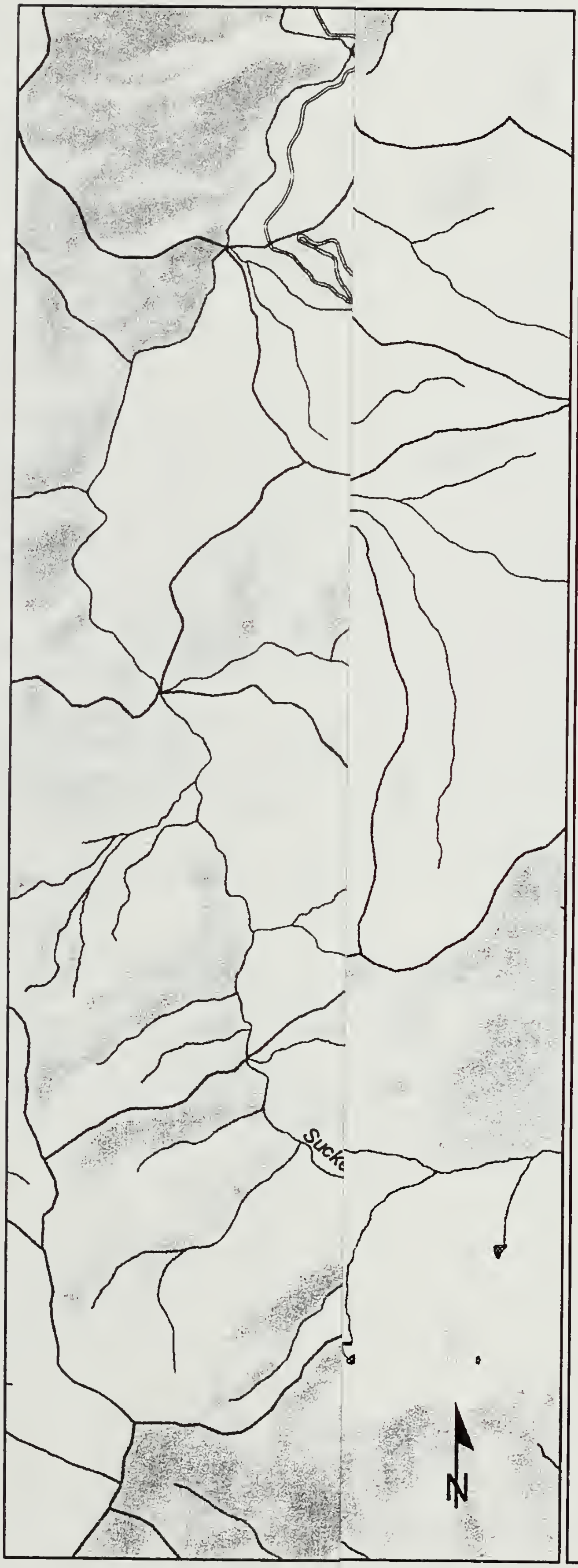
Water quantity and water integrity are also a major concern. During the summer months, the rate of water flow is at its lowest level for streams around the Monument. This coincides with maximum visitor use during the year and maximum water demand. In addition, water also supports habitats for native species of plants and animals including aquatic invertebrates which represent the lower tier of food chains upon which many species of animals, fish and insects depend for their survival. These species have even more significance as "seed" populations for streams in the lower reaches of the watershed that have been heavily impacted by silting from erosion in adjacent clearcuts. In this aspect, the significance of these "seed" invertebrates can be identified as playing a role in the successful survival of salmon and steelhead populations that use the Illinois River drainage for spawning. Indirectly, there is an interrelationship between aquatic invertebrates of Oregon Caves National Monument with sport and commercial fishing in the Illinois River watershed.

Relationship of Forest Ecology to Cave Ecology

Any change in the forest ecology in the surrounding landscape can potentially affect the ecology of the cave. Changes which can negatively affect the cave include: altering of plant and animal species composition, groundwater quality and quantity, air quality, and changes in forest structure. For example, timber cutting on USFS lands adjacent to the Monument can have a direct impact on the cave ecology by altering the soil structure and composition of decaying plant material, thereby altering the amount and quality of runoff into the cave.

Adequacy of Existing Boundary

In 1909, when the Monument was created, the boundary—a rectangle—was thought to be adequate to protect the cave. Through the years, scientific research and technology has provided NPS with new information about how a cave system functions, how it is influenced by the surface environment, and related hydrological processes. The current Monument boundary may not be configured adequately to allow for the protection and



ORCA GMP/EIS

FIGURE 4

Natural Features

Legend

- ▭ Park Boundary
- ⩘ Highway
- ▭ Watersheds
- ▨ Lakes
- ⩘ Streams

0 Kilometers 1

0 Miles 1

Data Sources:
SISKIYOU NF: hydrography, watersheds
USGS: Rogue River NF hydrography,
topography, park boundary, highway

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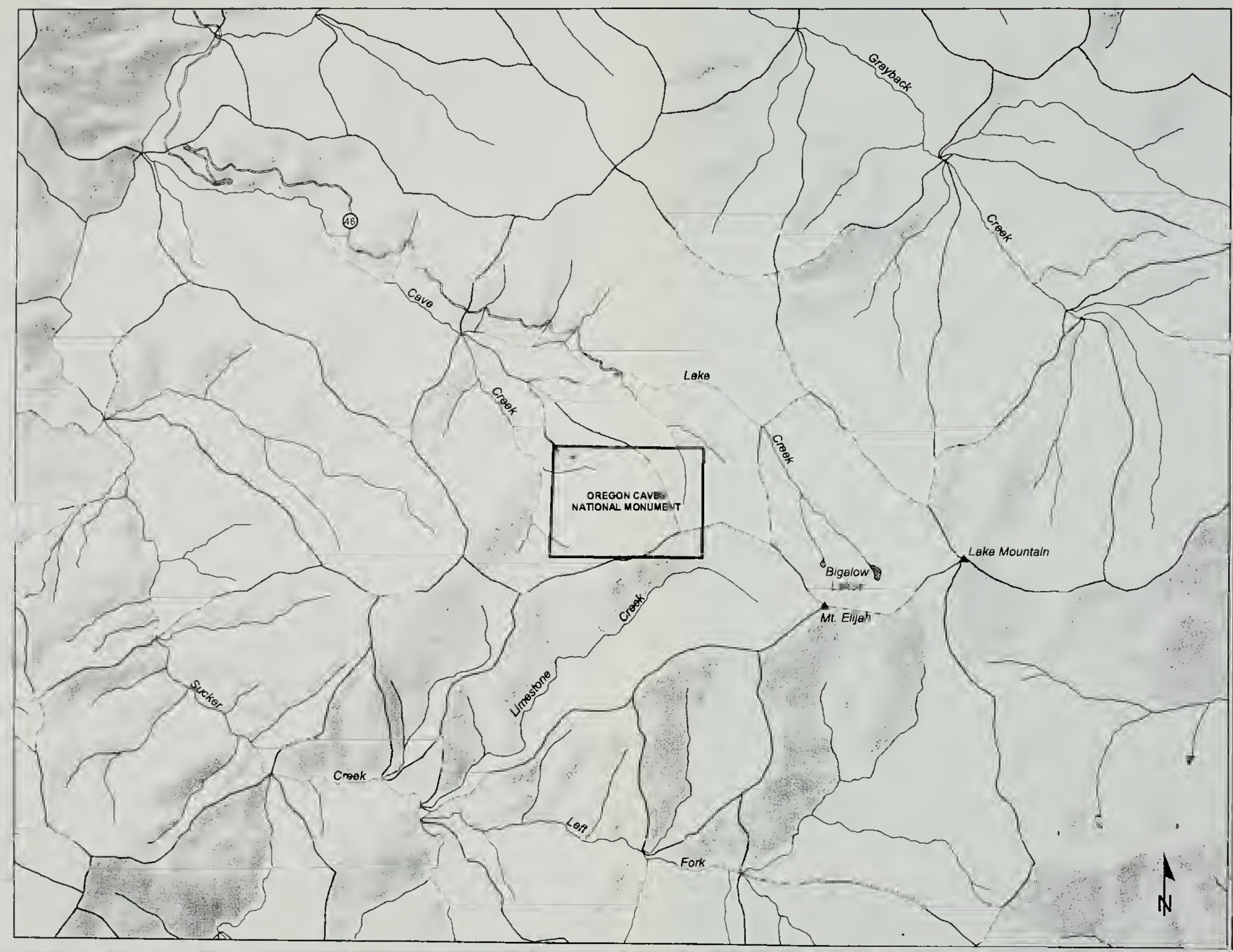
Natural Features

ORCA GMP/EIS

FIGURE 4

Natural Features



Legend

- ▭ Park Boundary
- ╱╲ Highway
- ▭ Watersheds
- ▨ Lakes
- ╱╲ Streams

Data Sources:
SISKIYOU NF: hydrography, watersheds
USGS: Rogue River NF hydrography, topography, park boundary, highway

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Natural Features

efficient management of cave resources. In addition, the public water supply for Monument visitors and staff is located outside the Monument on adjacent USFS land. Land activities, such as logging and grazing occurring around and within the watershed may have an impact on the water supply. Also, various forest practices on surrounding SNF lands have effects on the old-growth forest ecology within the existing Monument. Boundary modifications are addressed in this document as part of the required general management planning process.

Protection of Viewshed

Lands surrounding the Monument are managed by the USFS for multiple use with an emphasis on timber production. Land visible from various locations in the Monument's developed area has been cut, thinned, or replanted. The 1988 *Siskiyou National Forest Land and Resource Management Plan* (LRMP) recognizes the Monument and provides some protection such as limited visual retention zones. However, past timber management practices and logging operations have had a significant visual impact on the visitor experience. While reduced to some extent, current timber practices continue to have an effect on views of adjacent forest land as seen from the Monument's primary visitor use areas.

Management and Maintenance of Surface Trail System

The Monument's surface trail system is not wholly contained within the Monument boundaries. Trails exit and re-enter the Monument, crossing onto the SNF along the northern and western Monument boundary. The NPS currently has no control over activities outside the Monument which might affect these trails. No trails are wheelchair accessible.

Protection of Threatened and Endangered Species

The northern spotted owl issue and resultant 1995 *Northwest Forest Plan* have significantly altered both short and long-term USFS management planning for areas adjacent to the Monument. Most of the area around the Monument has been designated Late-Successional Reserve (LSR) for protection of the northern spotted owl and other old-growth dependent species. However, some management and harvesting activities are still permitted in these areas. Such activity could negatively impact owls which nest within the Monument, and other plant and animal species. (See Appendix C for copies of correspondence from U.S. Fish and Wildlife Service, regarding Section 7 Consultation for Endangered Species Act.)

Maintenance and Use of Cultural Resources and Visitor Facilities

Issues facing the Monument's cultural resources revolve around how the historic buildings will be used and maintained. Changes may affect the National Register historic district, and have a negative impact on the NHL, Chateau, in particular. Historic buildings need to be continually upgraded for health and safety reasons. This includes providing for barrier-free access, and meeting code requirements for fire extinguishers, smoke detectors, and fire exits. These changes or alterations can also adversely impact the historic designed landscape of the district (such as replacing steps with ramps, adding lighting, railings or other non-historic features). Questions include how the buildings and landscapes will be managed and how varying functions can occur within the buildings without a loss of historic integrity. Appropriate locations also need to be determined where Monument staff can interact with the public through ranger interpretive programs. (See

Appendix D for copies of correspondence from SHPO and the Advisory Council on Historic Preservation to NPS regarding 106 Compliance.)

Interpretation of Cave

Oregon Caves National Monument is the only unit in the National Park System in which the primary resource, the cave, is not interpreted by NPS staff. This is in direct conflict with NPS management policies. Personal interpretation of the main resource is conducted by a concessioner through a guided cave tour. The NPS creates standards and guidelines, and tours are subject to evaluation by the NPS. Direct operation of interpretive tours would allow the NPS to quickly adapt the interpretive program to changing resource protection and visitor needs. Alternatives for delivery of basic interpretation should be considered.

Management and Control of Fire

The current objective of the fire management program for the Monument is to allow fire to play its ecological role while protecting human life, facilities, and cultural resources. The current fire management program has been very active in fuels treatment and implementing prescribed fire in predetermined high hazard areas.

The last fire occurrence in the Monument was a prescribed fire in the fall of 1997. Before then, a large prescribed fire occurred in 1921. The period between 1921 and 1997 has been the longest fire-free period in more than 300 years. This period of fire exclusion has contributed to a significant fuel loading on the Monument today. It has also resulted in a change in the dominant vegetation and forest types. White fir and associated species are replacing the Douglas fir forest which was prevalent at the establishment of the Monument.

An interagency agreement between SNF and the Monument provides crucial fire suppression resources as well as assistance in implementing prescribed burns. It is annually reviewed and updated. This coordination has been important for the Monument due to its remoteness and small staff.

Presently, the fire management program has the following needs: providing protection of historic structures, sustainable funding for manipulation of fuels, and additional staff support in the Monument. The current *Oregon Caves National Monument Fire Management Plan* (March 1995) is presently being reviewed.

Development and Maintenance of Stronger Ties with Siskiyou National Forest

Oregon Caves National Monument staff has identified the need to develop and encourage stronger cooperative ties with the adjoining land managers of the Illinois Valley Ranger District, SNF. Communication between the two federal agencies would be on a variety of resource, administrative and visitor use issues. Coodination has occurred in the past on natural resource, recreation and visitor use issues, including the management and operation of the IVVC. However, existing agreements should be examined for their effectiveness and perhaps new ones created.

Restoration of Cave and Rehabilitation of Cave Trail and Lighting System

Rehabilitation of the cave trail and lighting system is currently underway. The old cave trail system and lighting will be improved for visitor use and safety, and protection of cave resources.

Appropriate Use of the Illinois Valley Visitor Center

The IVVC is located in Cave Junction, about 20 miles from the caves. Currently, one-third to one-half of all visitors to the Monument stop at the visitor center to get information about the Monument. The size of the visitor center and types of services provided should be evaluated.

Enhancement of Visitor Services

Visitor centers are the cornerstone of interpretation and visitor services at most NPS sites. Presently, there is no on-site visitor center at the Monument, where visitors can receive basic orientation, learn from interpretive exhibits, view an audio-visual program, ask questions of a ranger, or assemble school groups. Ranger-conducted programs must be delivered where space is available. Hence, most programs are forced to be presented in locations that are exposed to full sunlight or rain and subjected to distractions from visitors walking through the program site on their way to the ticket sales booth and noise from vehicles driving to and from the Chateau parking lot. Evening programs are delivered in the Chalet guest lobby where distractions and noise from the registration desk commonly detract attention from the programs. Under the current conditions, it is very difficult for Monument rangers to deliver effective safety and resource related interpretive programs. Visitor services should be addressed.

Adequacy of Administrative Support

Inadequate work and storage space for Monument staff, as well as the need for adequate housing, have been ongoing concerns. Appropriate locations for these administrative functions and their site relationships need to be identified and addressed in accordance with applicable NPS policies.

Adequacy of Cave Security Systems

Vandalism and theft make it necessary for the cave to be closed and accessible through a controlled security system. A system is currently installed but more work needs to be done to make it more efficient.

Development of Student Conservation Association and Student Intern Program

Volunteers have been instrumental in the success of the cave restoration program and in the operation of the IVVC. Assistance is needed with the preparation of prescription burn areas, removal of exotic plants and trail maintenance on the Monuments trail system. A program also needs to be developed to offer on-the-job-training for Student Conservation Association (SCA) or student interns who are interested in developing careers in the NPS or other government agencies. There is an opportunity for these programs to employ minority students or local minority populations, thus developing the potential for ethnic diversity in the NPS's future workforce.

For information on pertinent laws, policies, and procedures affecting the Monument see Appendix E .

Townsend's Big-earred Bat
(*Plecotus townsendii*)

Alternatives

Alternatives, Including the Proposed Action

Four alternatives are described in this plan; they respond to both NPS planning requirements and to the issues identified during the scoping process. The alternatives are characterized as follows: 1) Alternative A is the "No Action Alternative" which means a continuation of the present course of action, or maintenance of the status quo of existing policies and programs; 2) Alternative B is the "Minimum Requirements Alternative" and describes those minimum actions, consistent with the purpose of the park, that are required for the safe and effective operation of the park; 3) Alternative C is the proposed action and "Preferred Alternative;" it emphasizes optimal protection of the Monument resources and enhanced visitor experience; and 4) Alternative D envisions protection of the Monument resources and increased visitor services and facilities. (Refer to Summary of Actions for Each Alternative matrix at the end of this chapter.)

Actions Common to All Alternatives

The following actions will be taken by NPS regardless of the final alternative ultimately selected as the proposed action within the Record of Decision:

1) Rehabilitation of the cave trail—The rehabilitation work began in 1993 would be completed. Included in the work is establishment of a new trail surface, burying new electrical and communications lines in a conduit, improving cave lighting, continued removal of concrete and other rubble material from earlier trail use, and general enhancement of both the natural environment of the cave and the visitor experience.

2) Use of Ranger Residence above the Chalet—The historic Ranger Residence on the slope above the Chalet would continue to be used as office space for a field office.

3) Illinois Valley Visitor Center—The IVVC would continue to provide visitor orientation and information services about Oregon Caves National Monument, recreation activities in the nearby SNF, and recreational and tourism opportunities in and around the Illinois Valley area. Production of a new Long-Range Interpretive Plan would include the IVVC. Specific alternatives contain additional concepts for the IVVC in addition to continuing the current programs and use of the center.

4) Environmental education/outreach programs at the Monument—Monument staff would continue to conduct environmental education programs for students to learn about the Monument, its resources and history, and the cave and surface ecology.

5) Protection of the historic structures within the Oregon Caves Historic District—The five historic buildings within the National Register historic district, including the Chateau, would be retained and protected through appropriate preservation maintenance measures. The visual ambiance and character of the historic district would also be retained and protected in compliance with the National Historic Preservation Act and NPS policies.

6) Other cultural resource management actions—All the galvanized iron railings in the historic district would be replaced with material sensitive to the historic designed landscape. All use of modern commercial signs

would be limited or restricted. New signs would be in keeping with the historic character of the district.

7) Natural resource management—Within the cave, the Monument staff would continue to monitor the level of use, and inventory cave biota. The Monument staff would also develop a list of species endemic to the cave. An inventory and monitoring of flora and fauna would continue on surface lands, and the removal of exotic plants and animals from the Monument would be pursued in accordance with NPS policies. A geographic map of the administrative site would be prepared.

Implementation of the *Fire Management Plan* and fuel reduction in the existing Monument boundary would continue in order to decrease the possible occurrence of catastrophic fire. Management for prescribed burns would reduce hazardous fuel loads (accumulation of live or dead vegetative matter which is combustible) within the Monument and lower the chances for an uncontrolled fire that might damage the integrity of the Oregon Caves Historic District. Visitor safety would be enhanced by the reduction of fuels along the escape route on USFS Road 960 and 070 that serve as the alternative evacuation route for the Monument in the event that wildfire should close State Route 46.

Consultation with the public, USFS, and Oregon Fish and Game Commission would continue as required by state and federal law. All threatened and endangered (T&E) species would be protected.

8) Monument administration and maintenance—Replacement of the four and one-half miles of primary service lines for the Monument telephone system would provide for basic and emergency communications and technological upgrades of computers, telephones, and other communication equipment.

9) Accessibility—The NPS would provide the highest feasible level of physical access to historic structures for persons with disabilities. A transition plan would be initiated to determine which buildings could be adapted for accessibility consistent with the preservation of the properties' significant historical attributes. Any new concession contract would contain provisions for accessibility.

10) Water conservation—Water conservation measures would be taken at all facilities at Oregon Caves National Monument, as prescribed by NPS management policies. Water conservation practices, such as mitigating possible water distribution system leaks, low-flow shower heads, and low-flow flush toilets, would be explored and in place prior to seeking increased water quantities.

11) Suitable alternative for Port Orford cedar siding—Since Port Orford cedar is becoming more difficult to locate due to the Port Orford cedar root rot, a suitable alternative would be found to replace Port Orford cedar for use as siding for the historic buildings in the National Register historic district.

12) Regional cooperation—Monument staff would be available to serve as a member on the Illinois Valley District, SNF Interdisciplinary (ID) Team, the Southwest Oregon Province Advisory and the Southwest Oregon Provincial Interagency Executive Committees, which assist USFS managers and other neighboring land management agencies in the sound stewardship and management of forest resources (including input on timber harvest areas). Of primary concern to NPS as a participating member of the SNF ID team would be forest plans, programs and practices (such as timber harvesting) on national forest lands surrounding the Monument that would potentially affect Monument resources. The NPS would continue studies of edge effects to ascertain impacts associated with clear cutting, selective cutting, or management toward old-growth characteristics within LSR areas.

Alternative A—No Action Alternative

General Description of Alternative A

This alternative is a continuation of existing conditions. Under this alternative, no significant changes would occur in the current management and operation of the Monument. The NPS would maintain general responsibility for the protection of resources and provide opportunities for public use and enjoyment of the cave and other resources within the Monument. However, under this alternative, the NPS role would remain generally one of oversight, with the primary personal interpretation of the cave resource remaining under a concession contract for cave guide services. As economic conditions warrant, year-round concession food and lodging services and gift sales would continue to be offered to the public.

Regarding facilities, no on-site visitor center would be available to provide interpretive services to the public under this alternative. The IVVC in Cave Junction would continue to be the only location available for providing information and orientation services to Monument visitors. Additionally, no improvements would be made to collection storage or maintenance facilities, no additional staff housing would be provided, and the temporary modular administrative office that replaced the Monument headquarters building would be retained indefinitely.

No change to the existing Monument boundary would be proposed under this alternative.

Management Zones

Management zoning designates where uses would best fulfill management objectives and achieve the purposes of the Monument. Management zoning is a tool for park planners to assign appropriate uses within specific areas of a park and to manage visitor use and resource protection towards those uses. There would continue to be three zones within the Monument.

Historic Zone

This zone incorporates the National Register historic district of the Monument and includes: the Chalet, Guide Dormitory, Checking and Comfort Station, Ranger Residence, and the Chateau; the cave entrance; the Civilian Conservation Corps (CCC) stone steps; and historic inscriptions in the cave.

Park Development Zone

Within the Monument boundary, this zone includes the main parking lot, the temporary trailer for the Monument headquarters building, the parking area beyond the Chateau (the upper parking lot), the sewage galleries, water treatment facilities, and Monument roads. Also included in this zone, but located on USFS land, are an NPS residence, maintenance area, and collection storage in the quonset hut located at the administrative site just to the north of the present Monument boundary. The IVVC in Cave Junction is also zoned as Park Development.

Natural Zone

The Natural Zone includes two subzones: the Cave Subzone and the Surface Subzone. The Cave Subzone is defined as the cave and cave trail within the cave. The Surface Subzone includes the remaining land area within the Monument that is not in either the Park Development Zone or Historic Zone, including remnants of the horse trail and portions of the trail to the Town of Williams that are included within the Monument boundary.

Natural Resource Management

There would be no change in the natural resource management program including the existing fire management program, based upon the Monument's 1994 Resource Management Plan and 1997 Fire Management Plan.

Cultural Resource Management

There would be no change for the cultural resource management program, based upon the Monument's 1994 Resource Management Plan.

The quonset hut building at the administrative site would continue to be used for the storage of Monument-specific museum collections, library, and archive and manuscript collections under this alternative.

Maintenance work by the concessioner would continue to be performed on historic buildings within the Oregon Caves Historic District. Concession maintenance would continue to be monitored by Monument staff to ensure compliance with the Secretary of the Interior's Standards for Archeology and Historic Preservation (FR 48:44716-40).

Interpretation and Visitor Use

Under Alternative A, the concessioner would continue to conduct guided cave tours year-round. While retaining the option to conduct additional or special guided tours for a fee to the public, the NPS would not provide regularly scheduled tours. With a concessioner under contract to conduct guided cave tours, NPS interpretive responsibility regarding cave tours would remain largely one of oversight.

Other than year-round cave tours through a concessioner, a basic level of NPS interpretive programming would be provided under this alternative during the summer months. Basic interpretation would include an evening program, a daily naturalist program, and a campground program at the USFS Grayback Campground on Friday and Saturday evenings. Environmental education programs would be conducted typically during the spring months and would include special interpretive and environmental education programs including special cave tours, nature walks, and other interpretive tours to school groups and others. Community outreach and non-personal interpretation would also continue.

No staffed visitor center or other similar interpretive facility would be provided to the public on the Monument grounds at Oregon Caves under this alternative. Primary orientation and information services to Monument visitors would be accomplished at the IVVC, located some 20 miles northwest of the Monument in the community of Cave Junction. Currently, staff from the SNF operate the facility under a written agreement between the NPS and the USFS. The IVVC partners, including the NPS, USFS, BLM, Illinois Valley Chamber of Commerce, and the State of Oregon, have entered into a MOU regarding the use and function of the center. An NPS seasonal staff person, employees from the Illinois Valley Chamber of Commerce, along with community volunteers, augment USFS personnel. No increase in the current staff is proposed under this alternative.

The two exhibit panels located in the breezeway of the Chalet building and the kiosk adjacent to the main parking area would be maintained to provide interpretative information about cave ecology, the surrounding Siskiyou forest ecosystem, and other interpretive themes. Due to landsliding damage during the winter of 1996-1997 the Monument headquarters building at the edge of the main parking would no longer be available to Monument interpreters. (For more information refer to the Land Sliding section in The Affected Environment chapter.)

Recreation Resource Management

Recreational activities would continue on both the cave trail, and on the Monument's surface trails, and paths within the developed National Register historic district and throughout the Monument.

Scenic Resource Management

Under Alternative A, visitors would continue to observe clear-cut areas in foreground and middleground views from viewpoints within the Monument's developed area and on adjacent trails. A viewshed analysis conducted in the fall of 1996 by the planning team resulted in identifying the percentage of both foreground and middleground views of surrounding lands that can be seen looking out from certain popular viewpoints within the Monument. The results of the composite viewshed analysis revealed that for foreground views of surrounding lands (extending up to one-half mile) as seen from the Monument, 69% of Level I Sensitivity areas (viewpoints nearest the caves) and 54% of Level II Sensitivity areas are included within the existing Monument boundary. However, for the middleground views (extending up to four miles), only 6% of views are contained within the present boundary for the Level I Sensitivity areas and only 1% of middleground views for the Level II Sensitivity areas are contained within the present boundary. (Refer to The Affected Environment chapter, Visual Analysis section, for an explanation of what constitutes Level I and II Sensitivity areas for the foreground and middleground viewsheds.)

Park Facilities

Existing trails would be maintained. Maintenance on trail segments located within the SNF would continue to be maintained by the NPS under informal agreement.

During the winter of 1996-1997, heavy rains resulted in earth movements and landslides which damaged the Monument headquarters building located at the edge of the main parking lot. State and federal geotechnical engineers determined that the building was unsafe and would have to be vacated and removed. In order to provide critically needed administrative office space, a temporary office facility (trailer) was acquired and brought to the Monument. Use of this temporary trailer for administrative offices would continue under this alternative. Resource management staff would continue to occupy a small resource management office located in the Ranger Residence on the hillside above the Chalet. The historic Checking and Comfort Station adjacent to the entry drive would also continue to be used for public restrooms and Monument information.

At the administrative site on USFS land, the quonset hut with its serious deficiencies would continue to provide collection and administrative storage space, and house the wildland fire truck, fire cache, and emergency medical supplies and search and rescue (EMS/SAR) equipment. The present configuration of the maintenance area would not change.

The NPS would acquire all existing possessory interest held by the concessioner in all Monument buildings—the Chalet, Chateau, Guide Dormitory and a garage building. Possessory interest would be extinguished for all historic buildings according to NPS policies.

NPS maintenance operations would remain similar to existing conditions. Maintenance facilities would occupy the current maintenance shop located at the administrative site on USFS land. The existing single family residence would be retained, but no new staff housing would be provided on-site.

The Chateau would continue its historic hotel and dining functions. A concession gift sales area would continue to be operated out of the lower level of the Chalet building, and concession employee housing would continue to occupy the Guide Dormitory and the upper level of the Chalet.

Development Cost Estimates of Implementing Alternative A
There are no facility development costs associated with Alternative A.

Park Operations and Staffing

The Monument currently has 14 authorized FTE (Full Time Equivalent) staff, and an average of 21 staff (permanent, seasonal, and term) during the course of any one fiscal year.

Current Staffing Needs Under Alternative A

Administration	Maintenance	Interpretation	Resource Management	Total	FTE
2 Permanent	2 Permanent	2 Permanent	1 Permanent	7	7.0
0 Seasonal	6 Seasonal	3 Seasonal	3 Seasonal	12	6.0
0 Term	2 Term	0 Term	0 Term	2	1.0
2 Total	**10 Total**	**5 Total**	**4 Total**	**21**	**14.0**

Estimated Operating Costs (FY 1998 Dollars): $541,000.

Fees

There is no fee to enter the Monument. A fee for cave tours would continue to be charged by the contracted concessioner and retained under the terms of their contract.

Concessions

Current concession operations would continue under this alternative. This includes contracted concession services for food service, lodging, gift sales, and for guided cave tours. As economic conditions warrant, year-round overnight lodging and food service would continue to be offered to the public at the Chateau by a concessioner. Concession use of the lower level of the Chalet for gift sales would continue, and the upper level of the Chalet and the Guide Dormitory would continue to be available for concession employee housing. Possessory interest in the three historic buildings occupied by the concessioner would be extinguished according to NPS policies (refer to The Affected Environment chapter, Concessions section). Once possessory interest is acquired, the concessioner would lease space from the NPS.

Monument Hours and Seasons of Operation

Under the No Action Alternative, the Monument would remain open to public use the year-round, and guided cave tours would continue to be available throughout the year by concession guides. Lodging and food service would also be available year-round.

Proposed maximum hours of guided cave tour operation per day:
- 11½ hours maximum during the summer season
- 9½ hours maximum during the spring and fall seasons
- 7½ hours maximum during the winter season

Shuttle Systems

No regularly scheduled public or employee shuttle system is included in this alternative. However, the concessioner would continue an on-demand shuttle service.

Parking, Access and Circulation

The existing 99 space main parking lot would continue to provide parking for private vehicles. Vehicular access would continue to be provided to Chateau lodge patrons along the paved drive to the front of the Chateau. Patrons would be able to park in designated parking spaces in front of and beyond the Chateau in the upper parking lot on a space available basis. Assigned concession employee parking spaces would also continue in the upper parking area adjacent to the Chateau. Pedestrians and vehicles would continue to share the drive between the main parking lot and the Chateau.

Carrying Capacity

Under Alternative A, the present carrying capacity of Oregon Caves is defined as the maximum use (numbers of people and numbers of tours) of the cave for guided tours by the concessioner. (This use limit was developed in the 1975 *Oregon Caves National Monument Master Plan.* It related primarily to an assessment of the number of vehicles which could be accommodated in existing parking spaces. Impacts on resources or visitor experience were either not considered or not explained.)

The current maximum use is as follows:
- Tour length: 75 minutes by concession guides
- Group size limit: 16 persons maximum per tour group, plus guide
- Group size minimum: one person, plus guide
- Minimum interval between tours: 6 minutes

- Maximum number of cave visitors per day: 1760 persons

Other capacities:
- Main parking lot: 99 spaces including 2 spaces for visitors with disabilities
- Upper (Chateau) parking lot: 48 spaces including 2 spaces for visitors with disabilities
- Illinois Valley Visitor Center parking lot: 30 spaces including 4 recreational vehicle (RV) spaces and 2 spaces for visitors with disabilities

Monument Boundary

There would be no change to the Monument boundary of 484 acres. The NPS would continue to utilize the 80 acre administrative site under agreement with the USFS. No additional protection of the area surrounding the Monument would be included under Alternative A. (See Figure 5, Boundary Modifications: Alternative A.)

The USFS management of surrounding public forest lands would generally be expected to continue under the LSR category, with the assumption that management practices under these regimes (including timber harvesting and road building) would continue. It is also assumed that no additional resource protection from logging and grazing activities would be afforded the upper watershed area surrounding the Monument. In addition, all foreground and middleground viewsheds outside the present Monument would continue to be subject to permitted USFS timber harvesting activities.

Opportunities for Regional Cooperation

The NPS would continue to participate as an ex-officio board member of the IVVC under this alternative to continue to promote regional tourism, recreation, and visitor information. The NPS would maintain a working relationship with the Illinois Valley District Office of the SNF and the Grants Pass Resource Area Office of the Medford District, BLM.

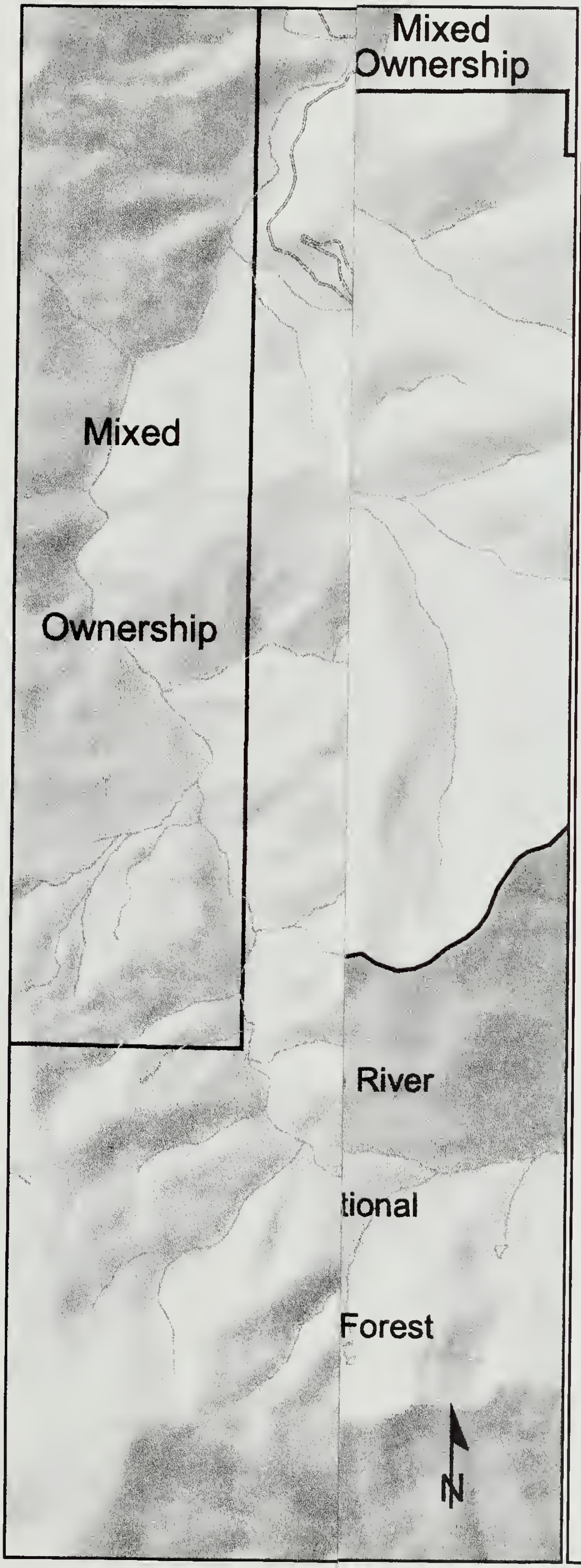

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FIGURE 5

Boundary Modifications: Alternative A

Legend

▨ Existing Park Boundary - 480 acres

Highway

Streams

0 Kilometers 1

0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary

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Boundary Modifications: A

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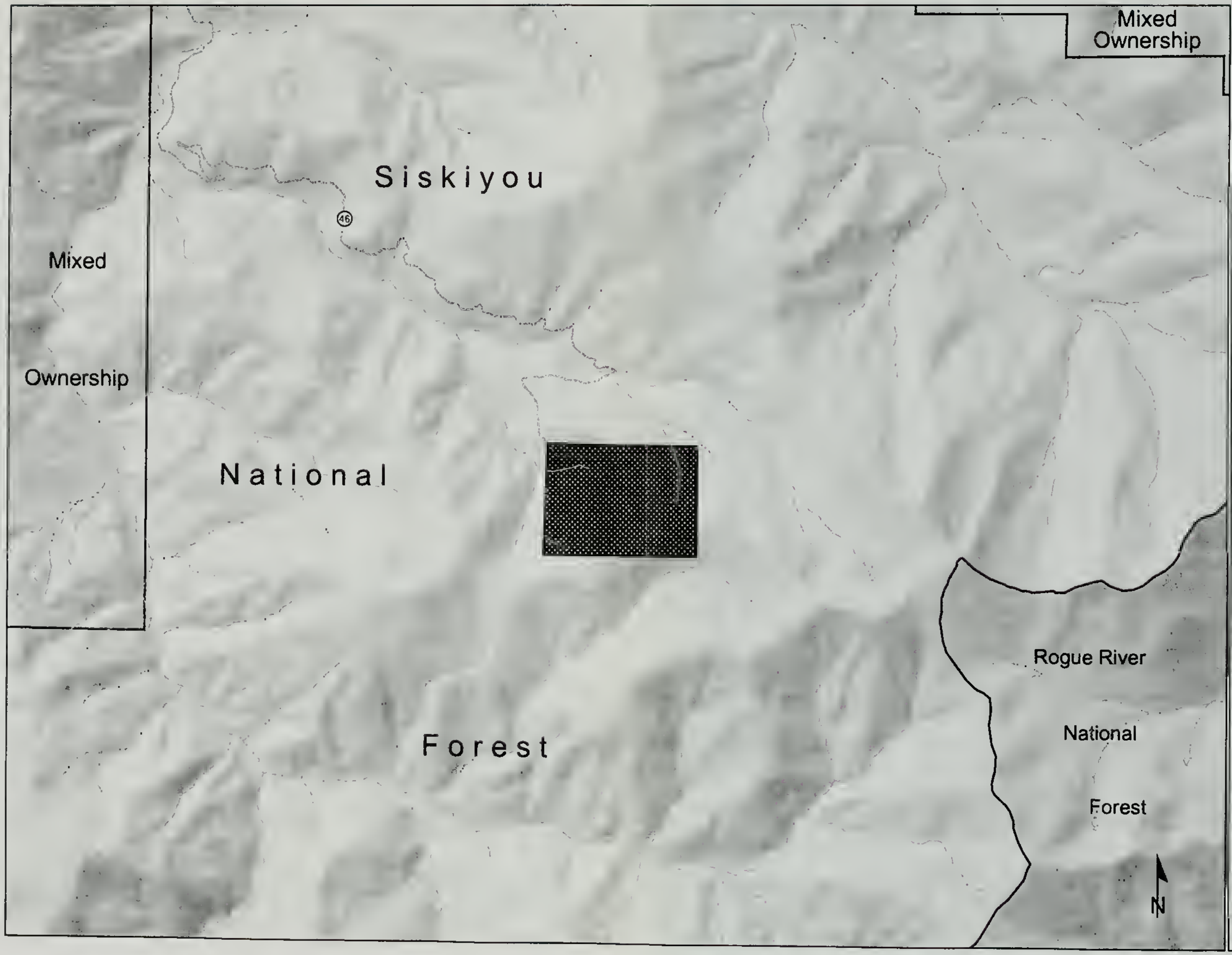
FIGURE 5

Boundary Modifications: Alternative A



Legend

▨ Existing Park Boundary - 480 acres

Highway

Streams

0 Kilometers 1

0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary

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Boundary Modifications: A

Alternative B—Minimum Requirements Alternative

General Description of Alternative B

Alternative B is known as the Minimum Requirements Alternative. Under this alternative, the NPS would undertake those actions that are necessary to ensure that the natural and cultural resources of the Monument were protected, and to provide for a level of public use and enjoyment which ensures continued public access to the Monument. Primary emphasis under this alternative would be to address any deficiencies in the areas of health and safety. Additionally, NPS staff would provide interpretation of the cave.

In order to provide an adequate and convenient place for the public to learn about Oregon Caves, an on-site visitor center would be established at the Monument. The visitor center would be located in the lower level of the Chalet. The center would provide the public with a basic level of orientation and interpretation about the Monument. Under this alternative, the NPS would also provide regularly scheduled guided cave tours of Oregon Caves.

The NPS would acquire all existing possessory interest held by the concessioner in all Monument buildings. Other than vending machines, no concession services would be provided at the Monument under this alternative.

The NPS would make improvements to the housing and maintenance area within the administrative site adjacent to the Monument on USFS land. Additionally, the Chateau would be used by the NPS for administrative offices and collection storage.

No boundary change is proposed under this alternative. However, a protected area, encompassing some 3,310 acres within the adjacent SNF is recommended surrounding the Monument. This protected area would remain part of the SNF, and be managed by the USFS in cooperation with the NPS under formal written agreement. Most of the protected area would be open to various forms of day recreation uses including hunting, fishing, hiking, nature study, cross-country skiing and snowshoeing.

Management Zones

Management zoning designates where various strategies for management and use would best fulfill management objectives and achieve the purposes of the Monument. Management zoning is a tool for park planners to assign appropriate uses within specific areas of a park and to manage visitor use and resource protection towards those uses. Under Alternative B there would be three zones within the Monument.

Historic Zone

This zone would incorporate the National Register historic district of the Monument; the cave entrance; the CCC stone steps; and historic inscriptions in the cave.

Park Development Zone

This zone would include the main parking lot, the upper parking lot above the Chateau, the sewage galleries, water treatment facilities and Monument roads. Also included in this zone at the administrative site located on

USFS land, would be both existing and proposed improvements to park housing, and maintenance area. The IVVC in Cave Junction also would be zoned as Park Development.

Natural Zone

The Natural Zone would include two subzones: the Cave Subzone and the Surface Subzone. The Cave Subzone would be defined as the cave and cave trail within the cave. The Surface Subzone would include the remaining land area including forested slopes, the Cave Creek and Lake Creek watersheds, remnants of the horse trail, and portions of the trail to the Town of Williams that are included within the Monument boundary.

Natural Resource Management

The existing natural resource management program, including the existing fire management program would continue to be implemented. However, in addition, the cave would be closed to guided cave tours between early December and mid-March for cave research, any necessary maintenance of the cave trail, and to allow the cave periods of extended darkness; restoring natural conditions during this period. This seasonal closure would also be expected to benefit the resident and migratory bat population of the cave by reducing the amount of artificial light and human activity in the cave during this period.

Since the public water supply for the Monument is located in the upper Lake Creek watershed (approximately 730 acres), the area would be restricted to grazing in cooperation with the USFS. As required by the Surface Water Treatment Rule of the Safe Drinking Water Act of 1982 (reauthorized in 1996), the Monument would prepare and submit a detailed watershed protection plan stating how this protection would be achieved. At a minimum, the NPS would encourage the elimination of livestock grazing from the watershed as a part of the cooperative agreement establishing the protected area.

Cultural Resource Management

Historic structures would be adaptively reused for public purposes, and to provide needed space for visitor interpretation and NPS administration of the Monument.

The Chalet would be used as a visitor center and for collection storage under this alternative, with the exterior of the building retaining its historic appearance. The Chateau would be used for park administrative offices under this alternative. Under Alternative B, the historic exterior appearance of the Chateau would be preserved, as would the main floor lobby of the Chateau, and the lower level coffee shop and dining area would be retained in their historic condition. The public could gain access to this area to view their historic features. The second, third and fourth floors of the Chateau would be used for Monument administrative offices and collection storage. Some alterations may need to be made to the upper floors of the Chateau in order to accommodate the administrative offices and related communications equipment and office configurations.

The Guide Dormitory and upper level of the Chalet would be retained for general park administrative use. No housing would be proposed in these two historic structures under this alternative. The historic Checking and Comfort Station adjacent to the main parking lot would be retained and continue to be used as public restrooms. The historic Ranger Residence would continue to be used as office space for a park field office.

Rehabilitation and maintenance work on historic buildings within the Oregon Caves Historic District would be performed in accordance with the Secretary of the Interior's Standards for Archeology and Historic Preservation (FR 48:44716-40).

Interpretation and Visitor Use

Under Alternative B, Oregon Caves would be available to the public for regularly scheduled guided cave tours between mid-March and early December of each year. Cave tours would be operated by the NPS. Basic public self-orientation, information, and on-site interpretation of the cave and other Monument resources would be met by converting the lower level of the Chalet into a visitor center. Emphasis in the center would be on a self-guided experience, including exhibits and multi-media presentations. An orientation audio/visual program would be provided for visitors. A small information desk and cooperating association sales area may be included, but the emphasis would be on a minimally staffed visitor center operation. Cave tours would commence at the Chalet visitor center.

The current Monument headquarters building next to the main parking lot would be removed and the administrative function moved to the Chateau. An entry plaza would be created at the former location of the Monument headquarters building and used for orientation for Monument visitors. An unstaffed information kiosk and interpretive panels would be designed for the space.

In addition to cave tours, a basic level of NPS interpretive programming would be provided during the summer months. Basic interpretation would continue to include a daily naturalist program, and a campground program at the USFS Grayback Campground on Friday and Saturday evenings. The environmental education/outreach programs would continue to be provided, typically during spring and fall months.

A new Long Range Interpretive Plan for the Monument would be developed following completion of the GMP.

The IVVC would continue to provide the first point of contact for information about Oregon Caves, and would be a principal point for visitors to make cave tour reservations and to purchase cave tour tickets. Improved signs in the Cave Junction area would direct visitors to the IVVC for information about the Monument and other attractions in the area, as well as to make cave tour reservations. However, primary orientation and interpretation would be provided at the Chalet visitor center. The visitor center in the Monument would also provide a secondary sales point for cave tour tickets. The NPS would provide interpretative staff at the IVVC during the summer only and would provide ticket sales for cave tours during the peak summer season. Other IVVC staff would provide this function during the non-peak season. Visitor orientation and information services would be enhanced at the existing building by adding permanent exhibits. Space would remain available to provide information about other area attractions and visitor services in coordination with IVVC partners.

Recreation Resource Management

Oregon Caves would be closed to guided cave tours from early December to mid-March. During this time the NPS would permit outdoor winter activities including cross country skiing, and snowshoeing. If overall use of the Monument during the winter increases, there will be a need for developing winter related interpretive literature and outdoor signing.

The 3,310 acre USFS protected area would be open to various forms of day recreation uses including hunting, fishing, hiking, nature study, cross-country skiing and snowshoeing. Vehicular access would be along existing roads. Snowmobile use would continue to be permitted on USFS roads that allow snowmobile use. No new campgrounds would be established and campers would be directed to one of two USFS campgrounds that exist in the area (Grayback and Cave Creek Campgrounds).

The upper Lake Creek watershed is approximately 730 acres (19.2% of the total protected area). Since the public water supply for the Monument is located here, the NPS would request the SNF to limit horse use to certain specified trails within the watershed. The spur road would be closed within the area and rehabilitated. Hikers would continue to use the Lake Mountain Trail to Mt. Elijah which is on the watershed divide and hikes could occur to Bigelow Lakes.

The NPS would request a restriction on hunting and mushroom picking within the 80 acre administrative site. Those uses are not compatible with residential, maintenance and administrative uses.

Scenic Resource Management

Establishing a 3,310 acre protected area on adjacent USFS land would provide additional protection from future visual impacts (predominately logging) as seen from important viewpoints within the Monument's developed area and on adjacent trails. For example, Viewpoint #1 (Refer to Figure 21, Viewshed 1 on page___ in The Affected Environment chapter) at the main parking lot is probably the most visited viewpoint. All foreground and middleground views from this critical viewpoint would be included within the adjacent protected area. Greater visual protection is afforded within the upper Lake Creek watershed where timber harvesting practices would be even more restrictive.

Under Alternative B, within the foreground composite viewshed, 100% of views within the Level I Sensitivity area (viewpoints nearest the caves) would be included in the Monument and adjacent protected area. The percentage of foreground views (extending up to one-half mile) included within the Level II Sensitivity composite viewshed increases from 54% to 67% over Alternative A. For middleground views (extending up to four miles), 62% of the Level I Sensitivity is contained within the existing Monument and protected area (up from 6% over the No Action Alternative), and 37% of Level II Sensitivity views are included (up from 1% in the No Action Alternative).

Park Facilities

Park facilities would include administrative offices located in the Chateau, visitor center and cooperating association sales area and collection storage space located in the Chalet, field office in the historic Ranger Residence, administrative use in the Guide Dormitory and the garage, and retention of the Checking and Comfort Station located at the head of the main parking lot. Due to storm damage during the winter of 1996-1997, the Monument headquarters building would be removed and replaced with an entry plaza and unstaffed kiosk for visitor use and orientation. No housing would remain in the historic district under this alternative. Seasonal employees would seek housing in the community.

The NPS would continue to request use of the present administrative site under a MOU with the USFS for housing, maintenance, storage, and administrative purposes. One residence would be maintained and the two rental trailers would be replaced with two duplex units at the administrative site. The quonset hut would be removed and collection functions moved to the Chalet. Additionally, the maintenance yard area would be reconfigured to provide covered storage space for equipment and materials. One bay would also be added to the garage area to house the fire truck.

The adequacy of existing water and sewage treatment systems for employee and visitor use (both quantity and quality) would be investigated for projected future use. Wherever possible, all above-ground utility lines would be buried for maintenance, visitor safety and aesthetic reasons.

The IVVC, located in the community of Cave Junction, would retain its current configuration.

Existing trails would be maintained. A formal written agreement with the USFS would be sought to address NPS maintenance on trail segments located within the SNF. This includes the Big Tree, No Name, Cave Creek and Lake Mountain trails.

Development Cost Estimates for Implementing Alternative B

Administrative Area (staff housing, maintenance area, rehabilitation, utilities and roads)	$ 880,000
Chalet Visitor Center (rehabilitation and exhibits)	$ 1,600,000
Chateau Administrative Offices (rehabilitation)	$ 830,000
Total Estimated Net Development Costs (FY 1998 Dollars)	$ 3,310,000

Park Operations and Staffing

Operational staffing needs would support Monument administration, maintenance, interpretation, resource management, and visitor and resource protection.

NPS would add a visitor protection ranger to Monument staff.

The Monument would have 22 authorized FTE staff under this alternative and an average of 37 staff positions including permanent, permanent subject to furlough, seasonal, and temporary positions.

Total Staffing Needs Under Alternative B

Administration	Maintenance	Interpretation	Resource Management	Total	FTE
2 Permanent	3 Permanent	3 Permanent	1 Permanent	9	9.0
0 Permanent/ Furlough	0 Permanent/ Furlough	10 Permanent/ Furlough	0 Permanent/Furlough	10	7.5
1 Seasonal	3 Seasonal	9 Seasonal	3 Seasonal	16	4.5
0 Term	2 Term	0 Term	0 Term	2	1.0
3 Total	**8 Total**	**22 Total**	**4 Total**	**37**	**22.0**

Estimated Operating Costs (FY 1998 Dollars)

Operating Base:	$ 541,000
Cave Tour Operations:	$ 280,000
Administration/Resource Management Enhancement:	$ 49,000
Visitor Center Maintenance and Operation:	$ 153,000
Total	**$1,023,000**
Estimated Revenues from Cave Tours:	$ - 320,000
Operating Cost After Offset:	$ 703,000
Difference in Operating Cost Between Alternative A (Current Base) and Alternative B:	$ 162,000

Fees

There would be no entry fee to the Monument. In Alternative B, the NPS would seek to use most or all of the fees generated by cave tours to directly support interpretation, cave protection and maintenance, research, and other projects on the Monument. This is consistent with the findings of the 1995 Oregon State University visitor survey in which the public overwhelmingly indicated (84 % of respondents) that cave fees should go to the Monument to maintain the area.

Concessions

Other than the possibility of providing regularly serviced vending machines in proximity to the Chalet visitor center, and in the former dining area of the Chateau, this alternative would not have any concession operations. This includes suspension of food service and lodging operations from the Chateau and gift sales from the Chalet. A small cooperating association sales area/bookstore would be established in the Chalet in conjunction with the visitor center under this alternative. All existing possessory interest in park facilities would be purchased from the concessioner by the NPS.

Monument Hours and Seasons of Operation

Under Alternative B, the Monument would be open to cave tours from mid-March to early December of each year, seven days a week. It would be closed to public cave tours in the winter in order to provide a resting period for the cave resources (especially bats), to conduct cave research, and any necessary maintenance. Except for cave tours, the Monument would be open for visitation the entire year. Other than vending machines located in the breezeway of the Chalet and in the former dining area of the Chateau, no contracted concession services would be provided to the public. Guided cave tours would be provided by NPS personnel.

Proposed maximum hours of guided cave tour operation per day:
- 11 hours maximum in the summer season
- 9 hours maximum in the spring and fall seasons
- 0 hours in the winter season (Monument closed to cave tours from early December to mid-March)

Shuttle Systems

No shuttle system for the general public would be proposed under this alternative. A shuttle van may be established for NPS and cooperating association employees. The shuttle van could leave each morning from the Cave Junction area and return in the late afternoon or early evening. The shuttle van could also serve employees living at the administrative site.

Parking, Access, and Circulation

Most visitors would continue to access the Monument from Caves Highway (State Highway 46). The State of Oregon would retain the right-of way for State Highway 46 as it currently exists under agreement with the SNF.

The main parking lot would be reconfigured. The paved drive between the main parking lot and the Chateau would be largely dedicated to pedestrians. Vehicular access to the drive during peak hours would be restricted to visitors with disabilities, the employee shuttle van, and official NPS vehicles related to maintenance and resource protection. Otherwise, employee access to the drive would be restricted to non-peak hours. Delivery vehicles would also be permitted on the drive, but would be encouraged to make deliveries during non-peak hours. Parking spaces would be assigned in the upper parking lot adjacent to the Chateau for the employee shuttle, official vehicles, and for NPS and cooperating association staff. Parking spaces for persons with disabilities would also be identified near the Chateau.

Carrying Capacity

In order to provide for the protection of cave resources and an optimal visitor experience the following carrying capacity targets for Oregon Caves would be established as the new standard for public use and access to the cave, based upon the optimum model following:
- Tour length: varied by NPS guides
- Group size limit: 14 persons maximum per tour group, plus guide
- Group size minimum: one person, plus guide
- Target interval between tours: 15 minutes

- Target maximum number of cave visitors per day: 700 persons
  (15 per tour x 4 tours per hour x 11 hours)

Other capacities:
- Main parking lot: 99 spaces including 2 spaces for visitors with disabilities
- Upper (Chateau) parking lot: 48 spaces including 2 spaces for visitors with disabilities
- Illinois Valley Visitor Center parking lot: 30 spaces including 4 RV spaces and 2 spaces for visitors with disabilities

Public use of the Monument would be monitored for impacts, and further adjustments affecting public access and use may be established as appropriate. It is acknowledged that a transition period may be necessary to accommodate the establishment of the cave tour reservation system and NPS ranger-led tours. If parking lot capacities at the Monument and the IVVC are reached on a continuing basis, then alternative strategies to accommodate Monument visitors would need to be pursued. This may include institution of a shuttle van system during peak periods.

Monument Boundary

No change in the present boundary configuration of 484 acres would be recommended under this alternative. The 80 acre administrative site would also be retained under an NPS agreement with the USFS. However, in coordination with the USFS, the NPS would seek special designation for protected area status involving some 3,310 acres of adjacent land within the SNF. This designation could be achieved through formal written agreement with the USFS. The basis of this coordination includes, but is not limited to, the following: 1) Among the purposes of the Act of June 4, 1897 which established the national forest system, favorable conditions of water flow are secured as part of the improvement and protection of the forest. 2) The Multiple Use-Sustained Yield Act (June 12, 1960) states that it is the policy of the Congress that national forests are established and administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes, and the purposes are supplemental to, but not in derogation of the purposes for which the national forests were established as set forth in the Act of June 4, 1897.

The area would be established for the following reasons: to protect the water quality of the upper watersheds which in turn protect the cave ecology and the public water supply, to maintain the natural forest ecology of the surrounding forest lands, and to protect foreground and portions of middleground views as seen predominately from within the Monument into the SNF. (See Figure 6, Boundary Modifications: Alternative B.)

This designated area is intended to protect the upper watershed and forest ecology surrounding the caves from current management activities that are negatively impacting, or are a potential hazard to the cave resources and the Monument's potable water supply. The protected area would also provide additional scenic viewshed protection.

Included in the protected area would be the upper Cave Creek watershed, upper and lower Lake Creek watersheds, including the foreground and portions of the middleground viewshed as seen from varying viewpoints around the Monument's developed area. Upper Cave Creek watershed and lower Lake Creek watershed would be managed under USFS guidelines for full visual retention as seen from viewpoints within the Monument's developed area.

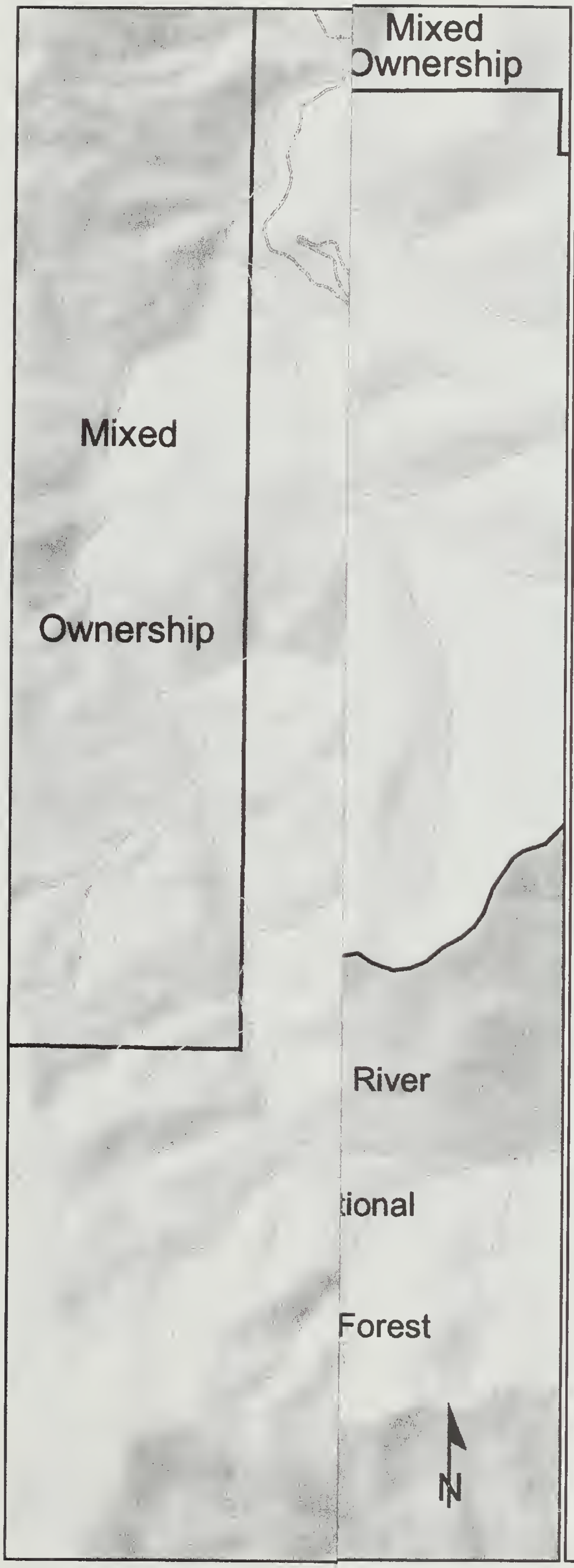

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FIGURE 6

Boundary Modifications: Alternative B

Legend

- ▩ Existing Park Boundary - 480 acres
- ▨ Protected Area (USFS) - 3310 acres
- Highway
- Streams

0 Kilometers 1

0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary
NPS: protected area

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Boundary Modifications: B

ORCA GMP/EIS

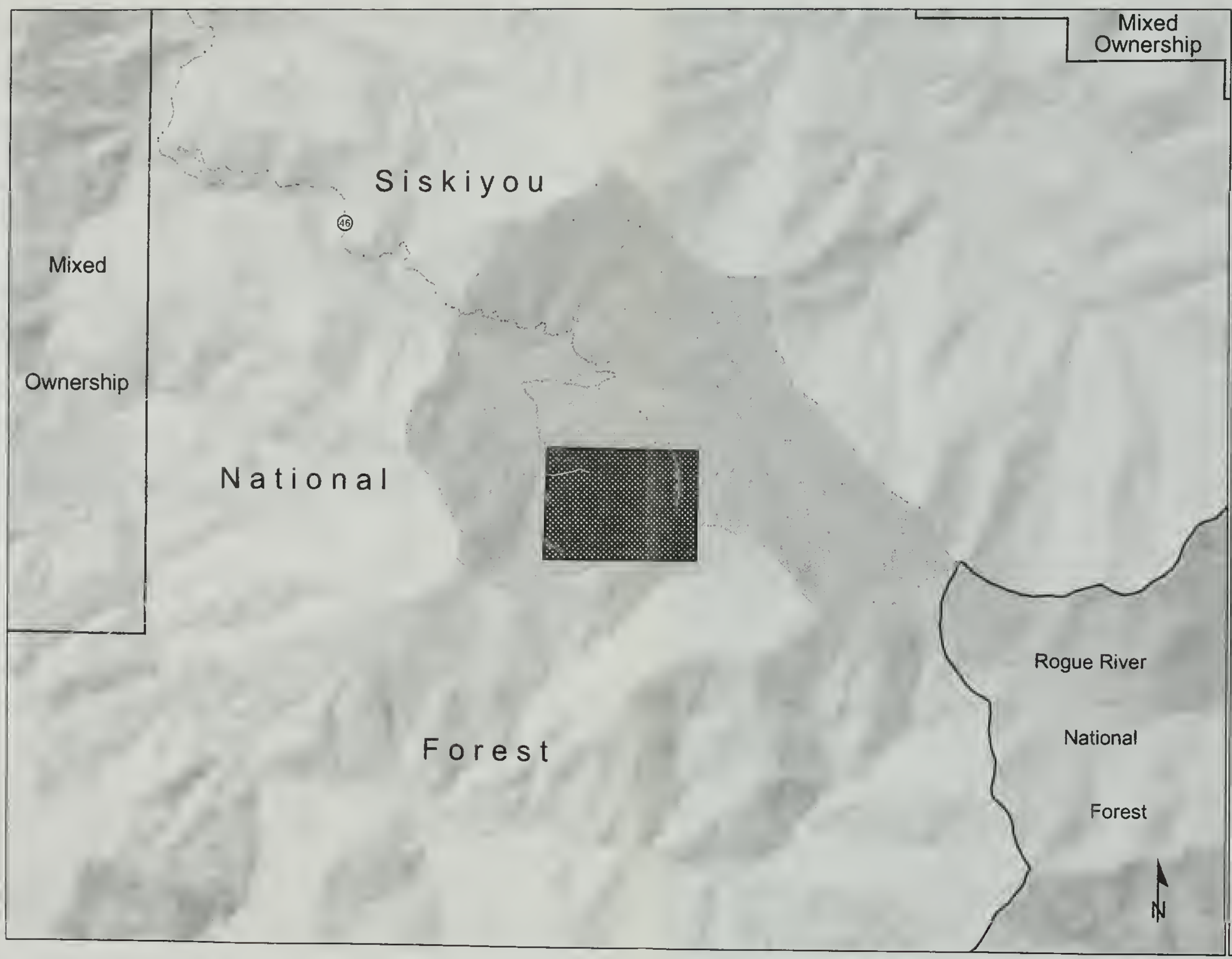

FIGURE 6

Boundary Modifications: Alternative B

Legend
▩ Existing Park Boundary - 480 acres
Protected Area (USFS) - 3310 acres
Highway
Streams
0 Kilometers 1
0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary
NPS: protected area

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Boundary Modifications: B

The protected area would be managed under USFS guidelines for full visual retention as seen from viewpoints within the Monument's developed areas and on adjacent trails. Full visual retention requires that management activities be conducted in such a way that they are completely subordinate to the natural character of the landscape, and are not distinguishable to the casual observer. In addition, timber would be harvested to allow for a natural ecological succession to a climax ecosystem. This would result in no harvesting of over 20% of base area based upon a predetermined base year. (Refer to Forest Service Bulletin 201.) Restrictions would be placed on certain logging activities and additional road building, with prohibitions placed on grazing. Upper Lake Creek watershed would be managed to protect the Monument's potable water supply.

Upper Lake Creek watershed is approximately 730 acres (19.2% of the total protected area). Since the public water supply for the Monument is located here, animal use would be restricted The spur road would be closed within the area and rehabilitated. Hikers would continue to use the Lake Mountain Trail to Mt. Elijah which is on the watershed divide and hikes could occur to Bigelow Lakes. As required by the Surface Water Treatment Rule of the Safe Drinking Water Act of 1982 (reauthorized in 1996), the Monument would prepare and submit a detailed watershed protection plan stating how this protection would be achieved.

Opportunities for Regional Cooperation

Opportunities would be the same as discussed in Alternative A. In addition, the NPS would work with the USFS to ensure preservation of the scenic entry corridor to the Monument through the national forest portion of the drive. Before it enters the national forest, Caves Highway is also part of the visitor experience. The Caves Highway is also part of the visitor experience from the IVVC to the SNF boundary. The NPS would encourage Josephine County and the gateway cit of Cave Junction to protect the scenic values along as part of the visitor experience.

Alternative C—the Preferred Alternative: Enhanced Protection of Monument Resources and Visitor Experiences

General Description of Alternative C

Implementation of Alternative C, the Preferred Alternative, would result in the NPS assuming a larger role in the provision of education and interpretive services to Monument visitors. The NPS would provide staff for operation of regularly scheduled public guided tours of Oregon Caves. Under this alternative, the NPS would acquire all existing possessory interest in all Monument buildings—the Chalet, Chateau, and Guide Dormitory, and a garage building. The lower level of the Chalet would be converted into a staffed visitor center complete with exhibits, audio-visual programming, information desk, and cooperating association sales area. The upper level of the Chalet would be modified into seasonal housing for use by NPS employees.

Visitor services, including lodging and food service, would continue to be provided in the historic Chateau through a concessioner. Concession gift sales would be moved to the lower level of the Chateau from their current location in the Chalet. The Guide Dormitory would remain available to the concessioner and/or the NPS as space for employee housing.

The NPS would construct replacement collection storage, administrative offices and housing at the existing administrative site.

In coordination with IVVC partners, the IVVC would be retained and enlarged. The IVVC would be the initial point of visitor contact for Oregon Caves—a place to obtain general information about the Monument—and would serve as the primary location to purchase cave tour tickets.

Congressional action would be required to make the 3,310 acre boundary modification proposed under this alternative. The boundary change is proposed in order to protect the ecology of the cave and its environs including the Lake Creek and Cave Creek watersheds. The expanded boundary would also protect the Monument's public water supply, surrounding forest ecology, and the foreground and midground viewsheds as seen from the Monument's developed area and adjacent trails.

Management Zones

Management zoning designates where various strategies for management and use would best fulfill management objectives and achieve the purposes of the Monument. Management zoning is a tool for park planners to assign appropriate uses within specific areas of a park and to manage visitor use and resource protection towards those uses. Under Alternative C there would be three zones within the Monument.

Historic Zone

This zone would incorporate the National Register historic district of the Monument; the cave entrance; the CCC stone steps; and historic inscriptions within the cave.

Park Development Zone

Within the Monument's boundary this zone would include the main parking lot, the upper parking area adjacent to the Chateau, the sewage galleries, water treatment facilities and Monument roads, and the helipad adjacent to USFS Road 960. Also included in this zone are both existing and proposed improvements to Monument housing, maintenance area, and the administration, maintenance, and collection storage areas located at the administrative site. The IVVC located in Cave Junction would also be included in the Park Development zone.

Regarding the lands proposed for transfer to the Monument from the SNF, the Park Development Zone would include current USFS Road 960 for fire access and public access to the Town of Williams and USFS Road 4611/070. Current USFS Road 4614/048 would also be included in this zone and would remain open for public use and access to adjacent forest areas. An interagency agreement would be developed to permit continued use of USFS Road 4612 for USFS management purposes. Such purposes would include access to timber management areas and transportation of materials, equipment and supplies by the USFS or their contractors, permittees or commodity purchasers. Through this agreement, the USFS would also be requested to continue maintenance of this short section of road through the expanded Monument.

Natural Zone

The Natural Zone would include two subzones: the Cave Subzone and the Surface Subzone. The Cave Subzone would be defined as the cave and cave trail within the cave. The Surface Subzone would include the remaining land area within the expanded Monument, including forested slopes, the Cave Creek and Lake Creek watersheds, remnants of the horse trail and portions of the trail to the Town of Williams that are included within the Monument boundary.

All lands added to the Monument boundary, which do not involve former USFS Roads listed as part of the Park Development Zone, would be included within the Natural Zone of the Monument.

Natural Resource Management

Though additional acreage would be transferred to the Monument, the same resource management guidelines would apply and the existing natural resource management program would continue to be implemented. In addition, in order to better protect the cave, the cave would be closed to guided cave tours between early December and mid-March for cave research, any necessary maintenance of the cave trail, and to allow the cave periods of extended darkness; restoring natural conditions during this period. This seasonal closure would also be expected to benefit the resident and migratory bat population of the cave by reducing the amount of artificial light and human activity in the cave during this period.

Since the public water supply for the Monument is located in the upper Lake Creek watershed, the Monument would prepare and submit a detailed watershed protection plan stating how watershed protection would be achieved, as required by the Surface Water Treatment Rule of the Safe Drinking Water Act of 1982 (reauthorized in 1996),

Also, mining would be excluded from within the Monument under existing statutes and regulations.

Fire

In order to restore natural conditions, fire would continue to be introduced in the Monument. This is necessary to reduce the liklihood of catastrophic fire affecting human life, property, designated resources, and to reestablish native vegetation types. Fire suppression over the past 80 years may have also contributed significantly to the increase of beetle and mistletoe infestations that are causing damage to the existing old-growth forest. It is also uncertain how the chemistry of water entering the cave has been changed by the increased availability of decayable materials on the forest floor or by the proliferation of shade tolerant plant species.

Under the Preferred Alternative, the transfer of additional acreage would change the complexity of the fire management program. A fire program (FIREPRO) budgeting analysis would be needed to address future fire funding for the Monument. The analysis would redefine values at risk and add the needed complexity to the present day analysis. Staff would be needed to implement an approved fire management plan as well as supervise an additional seasonal ranger who would assist in initial attack, implementing fire prevention programs, and emergency presuppression programs.

An enhanced fire cache would be developed in the maintenance area concurrent with the relocation of the parking/storage area for the wildland fire engine. A secondary fire cache would be developed in the existing garage to the south of the Chateau.

The fire hazard to the administrative site and the Chateau is still high and a balanced and active fuels management program is needed in order to protect Monument resources while still allowing fire to play an ecological role where appropriate. Management of fuels in areas that have been previously treated would be required due to the natural succession of vegetation that takes place. Management activities should be planned every three to five years as an on-going program in order to maintain resource protection needs. A "sustainable" fuels program is needed in order to avoid loss of capital investment by the occurrence of just one catastrophic fire.

Cultural Resource Management

At the administrative site, the quonset hut, currently used for collections and other storage, would be removed and replaced by a permanent structure. The new structure would be used for the storage of Monument specific museum collections, library, and archive and manuscript collections. The lower level of the Chalet would be used as a visitor center, with the exterior of the building retained in its historic appearance. The upper levels of the Chalet would be converted into housing for NPS seasonal employees. The Chateau would be retained for its historic use, as a lodge and coffee shop/restaurant. Concession gift sales would be located in the lower level of the Chateau. The Guide Dormitory would be retained and used for NPS and/or concessioner employee housing. The Checking and Comfort Station adjacent to the main parking lot would retain its historic use. The historic Ranger Residence would continue to be used as office space for a park field office.

Rehabilitation and maintenance work by the concessioner and NPS on historic buildings within the Oregon Caves Historic District would be performed in accordance with the Secretary of the Interior's Standards for Archeology and Historic Preservation (FR 48:44716-40). Historic compliance in this area would continue to be monitored by Monument staff.

Interpretation and Visitor Use

Under Alternative C, Oregon Caves would be available to the public for regularly scheduled guided cave tours between approximately mid-March and early December of each year. Tours would be operated by the NPS with direct supervisory control over cave guides. Basic public orientation, information, and on-site interpretation of the cave and other Monument resources would be met by converting the lower level of the Chalet into a visitor center. The visitor center would be a staffed center, with exhibits, interactive displays, and a moderately-sized audio-visual room/theater for multi-media presentations. An orientation audio/visual program would be provided for visitors.

The audio-visual room would also serve as a classroom for staff-led environmental education programs. A staffed desk and cooperating association sales area would also be included in the center. The visitor center and breezeway of the Chalet could serve as a meeting place for commencing cave tours.

Extended interpretive programming would be included under this alternative. During the summer peak season this may include evening programs, morning and afternoon nature walks, special cave tours, weekend campground programs at the USFS Grayback Campground, weekend guided hikes to Bigelow Lakes, and cave guide seminars. During the spring and fall seasons, special topic cave tours, nature walks, guide seminars and weekend guided Bigelow Lakes hikes could be included. The NPS would provide personal and non-personal interpretation of the forest/surface resources of the Monument, including the ecological and biological values in this area, as well as the geological story.

The Junior Ranger program would be expanded to include an activity book with age-appropriate activities for children visiting the Monument. Some activities would be designed to encourage visitors to interact with other parts of the Monument including trails, streams and the historic Chateau. Emphasis would be placed on addressing common resource problems such as feeding wildlife, cutting switchbacks, and touching cave formations.

With administrative offices moving to the administrative site, the temporary trailer for the former Monument headquarters building next to the main parking lot would be removed. An entry plaza on the site of the Monument headquarters building would be developed and used for orientation for Monument visitors. It would feature an information kiosk and interpretive panels.

The IVVC would remain a key point of contact for visitors, providing important information and orientation concerning the Monument. The interpretation plan for the center would be implemented under this alternative. Visitor information services would be enhanced at the existing building by providing permanent exhibits. Funding would be sought to enlarge the building to provide meeting room space, and space for a small Chamber of Commerce office, and enhanced space for information about recreation and tourism opportunities in the surrounding USFS, BLM, state and county lands. Interpretive displays explaining the unique geology and biology of the region would be developed. Emphasis would be directed toward providing alternate activities for people who have a long wait for cave tours or would like to stay longer in the area.

Special emphasis would be placed on development of interpretive displays and handouts that inform the public about the geologic and botanical uniqueness of this region with emphasis on recreational and tourism opportunities that help visitors find and enjoy these resources. Recreation and tourism opportunities include those found in federal, state and county managed lands within the Illinois Valley region as well as those that link to this area along the Highway 199 corridor or that share common botanical or geologic links to Oregon Caves National Monument. The NPS interpretation staff would also make efforts to improve and expand information about the Monument and surrounding region through the Internet which would provide users with details including local events, tours, seminars, seasonal flower displays, berry season, as well as information on trails and back country roads in the area.

The NPS would work with the USFS, the Illinois Valley Chamber of Commerce and other IVVC partners to seek funding sources to build an addition to the IVVC. The IVVC would be the principal place for visitors to purchase cave tour tickets. Both IVVC signing and staff would encourage visitors to purchase cave tour tickets at the IVVC before proceeding to the Monument. The NPS staff, augmenting others at the IVVC, would include ticket sales personnel for cave tours and a visitor use assistant during the summer peak season. Other IVVC staff would provide this function during the non-peak season. Visitor orientation and information services would be enhanced at the existing building by adding permanent exhibits; space would remain available to provide information about other area attractions and visitor services in coordination with IVVC partners.

The NPS interpretation staff at Oregon Caves would expand interagency cooperation and partnerships by developing Internet information that provides users with information about regional opportunities for recreation and tourism. Emphasis would be to provide tourism and recreation on federal, state and county lands within an area defined by the following areas: 1) the Illinois Valley, 2) Highway 199 corridor as it relates to tourist traffic between Redwood National Park, Oregon Caves National Monument and Crater Lake National Park, and 3) federal, state and county recreation opportunities within the Klamath-Siskiyou region that share a common biology and geology with Oregon Caves. The focus would be to develop an interpretive package that would unfold the uniqueness of this region and make it an appealing destination for American and international visitors who want to enjoy a vacation in an area with unique and diversified resources.

In addition, specific actions to improve the IVVC would be undertaken. To improve visitation, the landscape would be altered to make the building more visible by moving the current flag pole closer to the road. There is also a need to establish guidelines with the City of Cave Junction to trim branches of trees that obscure NPS signs along Highway 199 so visitors would know where to turn well in advance, giving them plenty of time to switch lanes safely.

The interagency agreement for the IVVC should be evaluated to ensure that the focus of this visitor center is on the promotion of tourism and recreation in southwest Oregon and the Siskiyou-Klamath geologic-biologic region. Emphasis would be on providing information for tourists traveling through the Illinois Valley between Redwood National Park and Crater Lake National Park. Interpretation emphasis at this facility should be to cover topics common to USFS, BLM and NPS units in this area (geology, botany, watersheds, and fire management) with emphasis on developing an understanding of why this region is unique.

Additionally, the center would provide information concerning state and county recreation units along with any cultural or interpretive activities they offer. The IVVC staff would compile and make available information about educational field trips or classes offered within the “designated region” (including environmental or native plant society tours, bird watching outings, and geologic seminars). The visitor center would also provide the Illinois Valley Chamber of Commerce to disseminate information on private recreation and tourism opportunities that exist in the area.

Expanded IVVC would allow for enhanced exhibit and information space

Improved signing would direct visitors to the IVVC for cave tour reservations and general information about the area

Recreation Resource Management

Oregon Caves would be closed to guided cave tours from early December to mid-March. During this time the NPS would permit outdoor winter activities including cross country skiing, and snowshoeing. If overall use of the Monument during the winter increases, there will be a need for developing winter related interpretive literature and outdoor signing.

Various recreational activities would be available to visitors on the 3,310 acres within the expanded Monument boundary. Non-motorized recreational opportunities, such as hiking, nature walks, and cross-country skiing and snowshoeing, would be available to Monument visitors. Snowmobile use would be permitted on certain roadways, but confined to use on those roads which provide direct access to adjacent USFS and other lands where snowmobile use is permitted.

The upper Lake Creek watershed is approximately 730 acres (19.2% of the total expanded Monument area). Since the public water supply for the Monument is located here, certain uses may be restricted for both humans and animals. Animal use would be restricted to horse use on horse trails. The USFS Road 070 spur would be closed within the area and rehabilitated. Hikers would continue to use the Lake Mountain Trail to Mt. Elijah which is on the watershed divide and hikes could occur to Bigelow Lakes.

No overnight campground facilities would be added by NPS. Adequate campground space is available at USFS Grayback and Cave Creek campgrounds. The NPS would work with the USFS to maintain the campground programs and amphitheatre setting at Grayback Campground. Audio/visual storage and use would be provided at the amphitheatre. A formal agreement with the USFS for interpretive programs would be sought by NPS.

The picnic areas at the Monument would be upgraded and expanded. Benches and rest areas would be provided on the Cliff Nature Trail. The benches would be compatible with the historic CCC benches.

The Monument would work to establish an interconnected system of trails with the adjacent Rogue River National Forest (RRNF) and SNF. To provide movement through the area by horse users, one or more trails would be available to horse use as appropriate.

No hunting is currently permitted within the existing Monument boundary. According to NPS policies, hunting restrictions would be extended onto lands added to the Monument.

Scenic Resource Management

The transfer of 3,310 acres of land into the Monument from the adjoining SNF would extend scenic viewshed protection to the foreground (extending up to one-half mile) views to include 100% of the Level I Sensitivity areas and 67% of the Level II Sensitivity areas.

Foreground and much of the middleground views within the Lake Creek watershed would be added to the Monument

For the middleground viewshed (extending up to four miles), Alternative C would protect 62% of the Level I Sensitivity areas and 37% of Level II Sensitivity areas into the forest canopy and ridgetops as seen from the Monument's most important viewpoints including the National Register historic district and adjacent trails. Alternative C would provide the highest degree of total viewshed protection compared with all other alternatives since timber cutting would be precluded within the expanded Monument. This alternative would provide protection from visual impacts (predominately clearcutting and road building) as seen from important viewpoints within the Monument and on adjacent trails. Viewpoint #1 at the main parking lot is probably the most visited viewpoint. All foreground and middleground views from this critical viewpoint are contained within the Monument and the additional area proposed for inclusion within the Monument.

Park Facilities

Monument operated facilities would include administrative offices, collection storage and a maintenance area located at the administrative site; a visitor center and cooperating association sales outlet located in the Chalet; restrooms and an information kiosk located in the Checking and Comfort Station at the head of the main parking lot; and the IVVC located in Cave Junction.

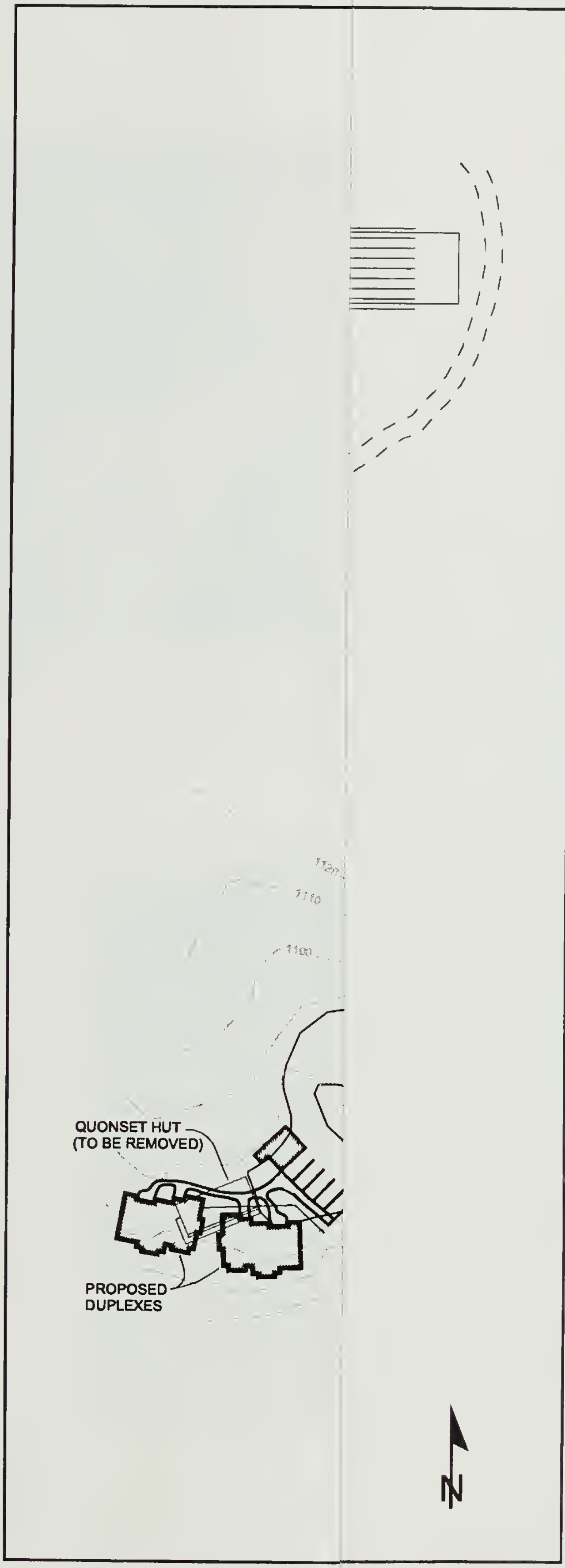
All possessory interest in Monument buildings would be extinguished according to NPS policies. The lower level of the Chalet would be converted into the Monument's visitor center, complete with cooperating association sales area. The upper level of the Chalet would be rehabilitated for NPS seasonal housing. The Chateau would continue to be operated by a concessioner for lodging, food service and gift sales.

The NPS would construct replacement collection storage, administrative offices and housing at the existing administrative site. (See Figure 7, Development Concept Plan: Administrative Site.) The two rental trailers currently used for seasonal housing would be removed and replaced with two duplex housing units to serve seasonal and/or permanent staff needs. The existing single family residence would be retained. The quonset hut, currently used for collection storage, Monument records, interpretative materials, wildland fire truck and cache, and EMS/SAR equipment, would be replaced by a permanent building. Additionally, the maintenance yard area would be reconfigured to provide covered storage space for equipment and materials. One bay would also be added to the garage area to house the fire truck.

The tempory trailer replacing the Monument headquarters building next to the main parking lot would be removed and the function moved to the administrative site. An entry plaza would be created for visitor orientation, interpretation, and information in that location. Signs in the proximity of the entry plaza, and entry to the drive and pedestrian walkway would help guide visitors to the Chateau complex and cave entrance.

The adequacy of the water and sewage treatment systems at the Monument for employee and visitor use (both quantity and quality) would be investigated for possible future increases in use.

The IVVC would be retained and enlarged. The IVVC would be the initial point of visitor contact for Oregon Caves—a place to obtain general information about the Monument—and would serve as the primary location to purchase cave tour tickets. Information signs for the IVVC would be improved and could include such information as ticket sales, and vehicle limitations of Highway 46.



ORCA GMP/EIS

FIGURE 7

Development Concept Plan: Administrative Site

Legend

Contours

Asphalt Road

Gravel Road

6" Waterline

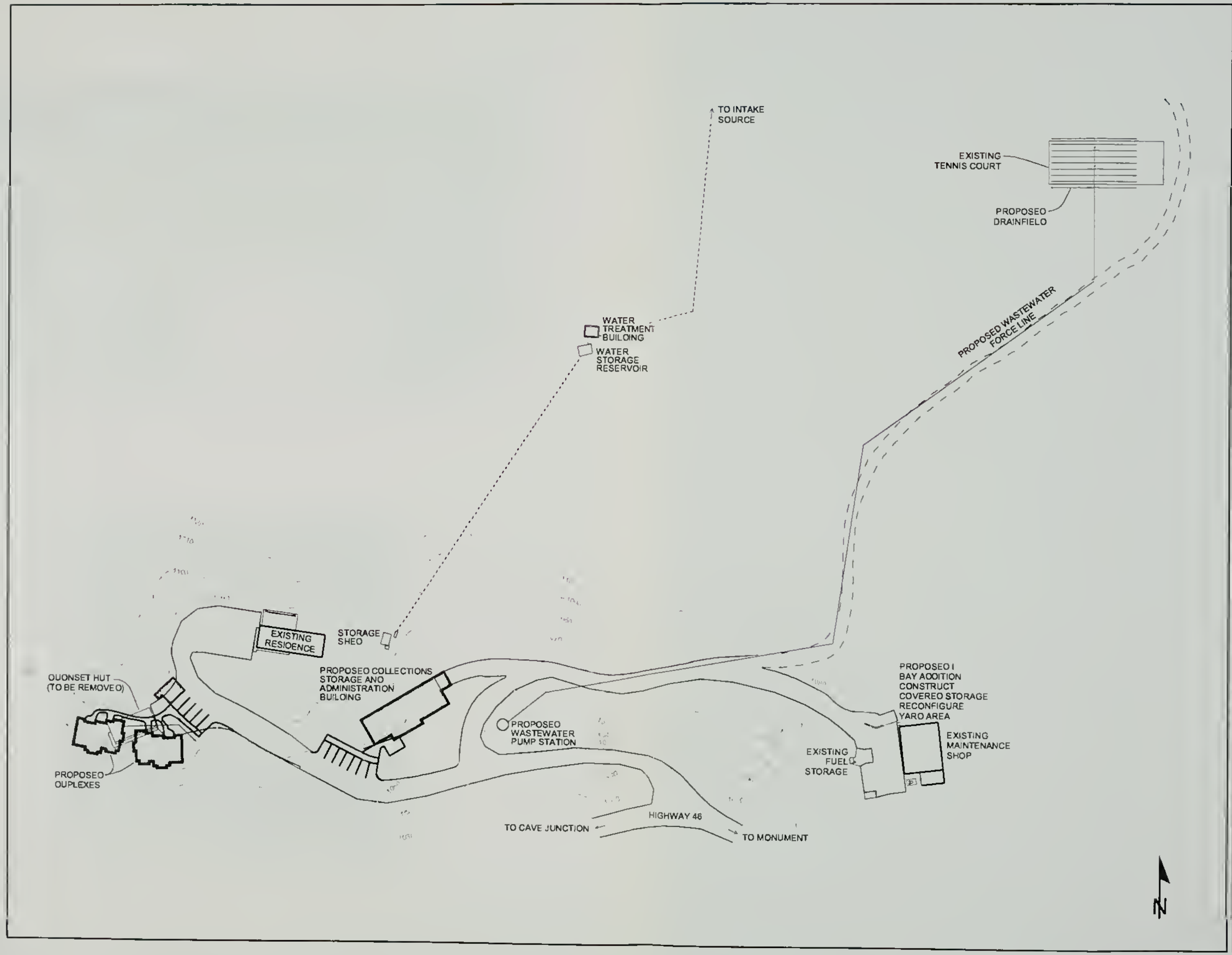
40 20 0 40 80
SCALE OF FEET

Data Source:
NPS: Administrative Site
AutoCAD Drawing
K:\GIS\AVPROJ\ORCA\GMPMAPS.APR
Administrative Site

ORCA GMP/EIS

FIGURE 7

Development Concept Plan: Administrative Site


TO INTAKE SOURCE
EXISTING TENNIS COURT
PROPOSED DRAINFIELD
WATER TREATMENT BUILDING
WATER STORAGE RESERVOIR
PROPOSED WASTEWATER FORCE LINE
STORAGE SHED
EXISTING RESIDENCE
QUONSET HUT (TO BE REMOVED)
PROPOSED COLLECTIONS STORAGE AND ADMINISTRATION BUILDING
PROPOSED WASTEWATER PUMP STATION
PROPOSED DUPLEXES
PROPOSED I BAY ADDITION CONSTRUCT COVERED STORAGE RECONFIGURE YARD AREA
EXISTING MAINTENANCE SHOP
EXISTING FUEL STORAGE
HIGHWAY 46
TO CAVE JUNCTION
TO MONUMENT
N

Legend

Contours

Asphalt Road

Gravel Road

6" Waterline

40 20 0 40 80

SCALE OF FEET

Data Source:
NPS: Administrative Site
AutoCAD Drawing
K:\GIS\AVPROJ\ORCA\GMPMAPS.APR
Administrative Site

Collection storage in quonset hut would be replaced by a new structure at the administrative site

A bay would be added to the garage area to house the fire truck, and the maintenance yard area would be reconfigured

USFS Road 960 A portion of this road is within the proposed Monument expansion and would remain open to public use

Existing trails would be maintained. Big Tree and No Name trails would be maintained as part of the trail system within the expanded Monument. Maintenance and management of the section of the Mt Elijah Trail within the SNF to the top of the peak would be coordinated with the USFS under formal written agreement.

The NPS would maintain roads within the expanded Monument. This would include current USFS Road 960 for fire access, as well as to allow public access to and from the Town of Williams and access to USFS Road 4611/070. Through interagency agreement, the USFS would be requested to continue maintenance of a short section of USFS Road 4612/13 through the expanded Monument, which would remain open for public access and use. The USFS Road 070 spur into the upper watershed of Lake Creek would be closed to vehicular use to protect the upper Lake Creek drainage and Bigelow Lakes. Hiking trails would allow for continued visitor access into this area.

Wherever possible, all above-ground utility lines would be buried for maintenance, visitor safety and aesthetic reasons.

Development Cost Estimates for Implementing Alternative C

Administrative Area (collection storage, administrative offices, staff housing, maintenance area, rehabilitation, utilities and roads)	$ 1,330,000
Chalet Visitor Center (rehabilitation, exhibits, staff housing)	$ 2,825,000
Illinois Valley Visitor Center (addition, exhibits)	$ 100,000
Total Estimated Net Development Costs (FY 1998 Dollars)	$ 4,255,000

Park Operations and Staffing

The present administrative site would be included in the expanded Monument under this alternative. Operational staffing needs would support Monument administration, maintenance, interpretation, resource management, and visitor and resource protection. Additional interpretive staff over Alternative B are required because of greater emphasis upon environmental education programs and other educational activities. There are also additional maintenance expenditures associated with the conversion of the upper level of the Chalet into housing, and road and trail maintenance on added lands.

The NPS would maintain a visitor protection presence on the Monument staff.

The Monument would have 24 authorized FTE staff under this alternative with an average of 39 staff positions including permanent, permanent subject to furlough, seasonal, and temporary positions.

Total Staffing Needs Under Alternative C

Administration	Maintenance	Interpretation	Resource Management	Total	FTE
2 Permanent	3 Permanent	4 Permanent	2 Permanent	11	11.0
0 Permanent/ Furlough	0 Permanent/ Furlough	10 Permanent/ Furlough	0 Permanent/Furlough	10	7.5
1 Seasonal	3 Seasonal	9 Seasonal	3 Seasonal	16	4.5
0 Term	2 Term	0 Term	0 Term	2	1.0
3 Total	**8 Total**	**23 Total**	**4 Total**	**39**	**24.0**

Estimated Operating Costs (FY 1998 Dollars)

Operating Base:	$ 541,000
Cave Tour Operations:	$ 280,000
Administration/Resource Management Enhancement:	$ 49,000
Additional Resource Management (New Area):	$ 86,000
Additional Maintenance (New Area):	$ 22,000
Visitor Center Maintenance and Operation:	$ 153,000
Total	**$1,131,000**
Estimated Revenues from Cave Tours:	$ -320,000
Operating Cost After Offset:	$ 811,000
Difference in Operating Cost Between Current Base (Alternative A) and Alternative C:	$ 270,000

Fees

There would be no entry fee to the Monument itself. This alternative would allow the NPS to use most or all of the fees generated by cave tours to directly support interpretation, cave protection and maintenance, research and other projects at the Monument through the fee interpretation program. This is consistent with the findings of the 1995 Oregon State University visitor survey in which the public overwhelmingly indicated (84 % of respondents) that cave fees should go to the Monument to maintain the area.

No fees for parking at trailheads would be charged within the expanded Monument.

Concessions

Concession services under Alternative C would include lodging, food service, and sales of sundries and gift items. Lodging and food service would be provided to the public in the historic Chateau. Since the Chalet would be converted into the Monument visitor center, the gift sales area would be moved out of the Chalet into the lower level of the Chateau. A gift shop mission statement would be developed so as to help ensure that both the operation and sales items were appropriate for the Monument and the historic setting. The coffee shop would remain open for its traditional food service use.

Required services for food, lodging, gift and sundries sales would be during the peak season. The concessioner would be encouraged to provide some or all of these services during the non-peak times of the year, as conditions warrant, and at their discretion. The food service priority would be to serve the peak hour needs of the visitor.

The Guide Dormitory would continue to be used by the concessioner as space for concession and/or NPS employee housing according to the terms of a new concession contract.

During the off-season between early December and mid-March, no concession services would be provided. However, limited food service may be established for researchers, and park and concessioner maintenance and administrative employees during this period.

The NPS would proceed to acquire any existing possessory interest held by the concessioner within the Monument as prescribed by NPS policy. Highest priority for acquisition of interest would be the Chalet since the structure would be adapted for use as the Monument visitor center under this alternative.

Monument Hours and Seasons of Operation

Under Alternative C, the Monument would be open to cave tours from mid-March to early December of each year, seven days a week. It would be closed to public cave tours in the winter in order to provide a resting period for the cave resources (especially bats), to conduct cave research and any necessary maintenance. The concessioner may also choose to conduct scheduled maintenance and repair items for the Chateau and Guide Dormitory during this period. Except for cave tours, the Monument would be open for visitation the entire year. Contracted concession services would be provided to the public. Guided cave tours would be provided by NPS personnel.

Proposed maximum hours of guided cave tour operation per day:
- 12 hours maximum in the summer season
- 11 hours maximum in the spring and fall seasons
- 0 hours in the winter season (Monument closed to cave tours from early December to mid-March)

Shuttle Systems

No regularly scheduled shuttle van service for the general public would be proposed under this alternative. However, the concessioner may provide on-demand shuttle service for lodge patrons and day visitors, as possible. As funding is available, a shuttle van for NPS, cooperating association and concession employees would be provided. It would be expected to leave each morning from the Cave Junction area and return in the late afternoon/early evening. Depending upon demand and work schedules, the shuttle may make more than one run per day. The employee shuttle would also stop at the administrative site. Various funding sources would be explored to assist in the operation.

Parking, Access and Circulation

The general public would continue to access the Monument from State Highway 46 and be directed to park in the main parking lot. The State of Oregon would retain the right-of-way for State Highway 46 as it currently exists under agreement with the SNF. The NPS would become the managing authority for future easements of right-of-way extensions within the expanded boundary, but no additional permits or agreements would be required for the existing highway.

Visitor parking within the National Register historic district would be restricted to designated spaces adjacent to the Chateau for persons with disabilities and those visitors having confirmed lodge reservations at the Chateau. No general visitor vehicular access would be permitted on the drive between the main parking lot and the upper parking lot. Except for permitted vehicles involving mobility impaired visitors, all day-use visitor vehicles would be eliminated from the National Register historic district under this alternative. Lodging patrons and visitors with disabilities would use designated parking spaces adjacent to the Chateau. On-duty staff would also be assigned parking, and provisions would be made for delivery and maintenance vehicles. A few spaces for official U.S. government and concession vehicles would also be designated near the Chateau as part of the employee parking area. An employee shuttle van may be employed to transport concession, cooperating association, and NPS employees to and from the Monument, the IVVC in Cave Junction, and the administrative site. Concession and NPS employees with similar scheduled work days and hours would be highly encouraged to take the shuttle van from Cave Junction if it becomes operational.

To help ease vehicular and pedestrian traffic conflicts between the main parking lot and the upper parking lot, a one-way traffic system would be established along with a delineated pedestrian walkway on the hillside of the drive. This one-way traffic system would prevent cars from passing each other on the drive by allowing traffic flow in only one direction at a time. The current paved driveway into the historic district and cave entrance area would be modified into a one-way drive through the use of stop lights at each end. This one-way traffic system would prevent cars from passing each other on the drive by allowing traffic flow in only one direction at a time. (See Figure 8, Development Concept Plan: Parking and Entry Area.)

Carrying Capacity

Under Alternative C, in order to provide for the protection of cave resources and an optimal visitor experience, the following carrying capacity targets for Oregon Caves would be established as the new standard for public use and access to the cave, based upon the optimum model following:
- Tour length: varied by NPS guides
- Group size limit: 14 persons maximum per tour group, plus guide
- Group size minimum: one person, plus guide
- Target interval between tours: 15 Minutes minimum between tours
- Target maximum number of cave visitors per day: 700 persons

Other capacities:
- Main parking lot: 99 spaces including 11 RV spaces and 2 spaces for visitors with disabilities
- Upper (Chateau) parking lot: 48 spaces including 2 spaces for visitors with disabilities
- Illinois Valley Visitor Center parking lot: 30 spaces including 4 RVspaces and 2 spaces for visitors with disabilities

Main parking lot would be reconfigured

Pedestrain access for picnic area and No Name Trail would be improved

FIGURE 8a

Development Concept Plan
Parking and Entry Area

Key Features:

- One-Way traffic on access road between Main Parking Lot and Chateau/Chalet regulated by traffic light.
- Upper Parking Lot restricted to Lodge patrons, on-duty staff and mobility impaired visitors.
- Designated Pedestrian Path between Main Parking Lot and Chateau/Chalet.
- Interpretive Exhibits convenient to Checking and Comfort Station, Upper Picnic Area, and Access Road.
- Pull-through RV parking spaces.
- Improved entrance to Lower Picnic Area and No Name Trail.
- Planting Area provides a sense of separation between Monument Entry and parking lot.
- Monument headquarters building removed. Function relocated to administrative site.

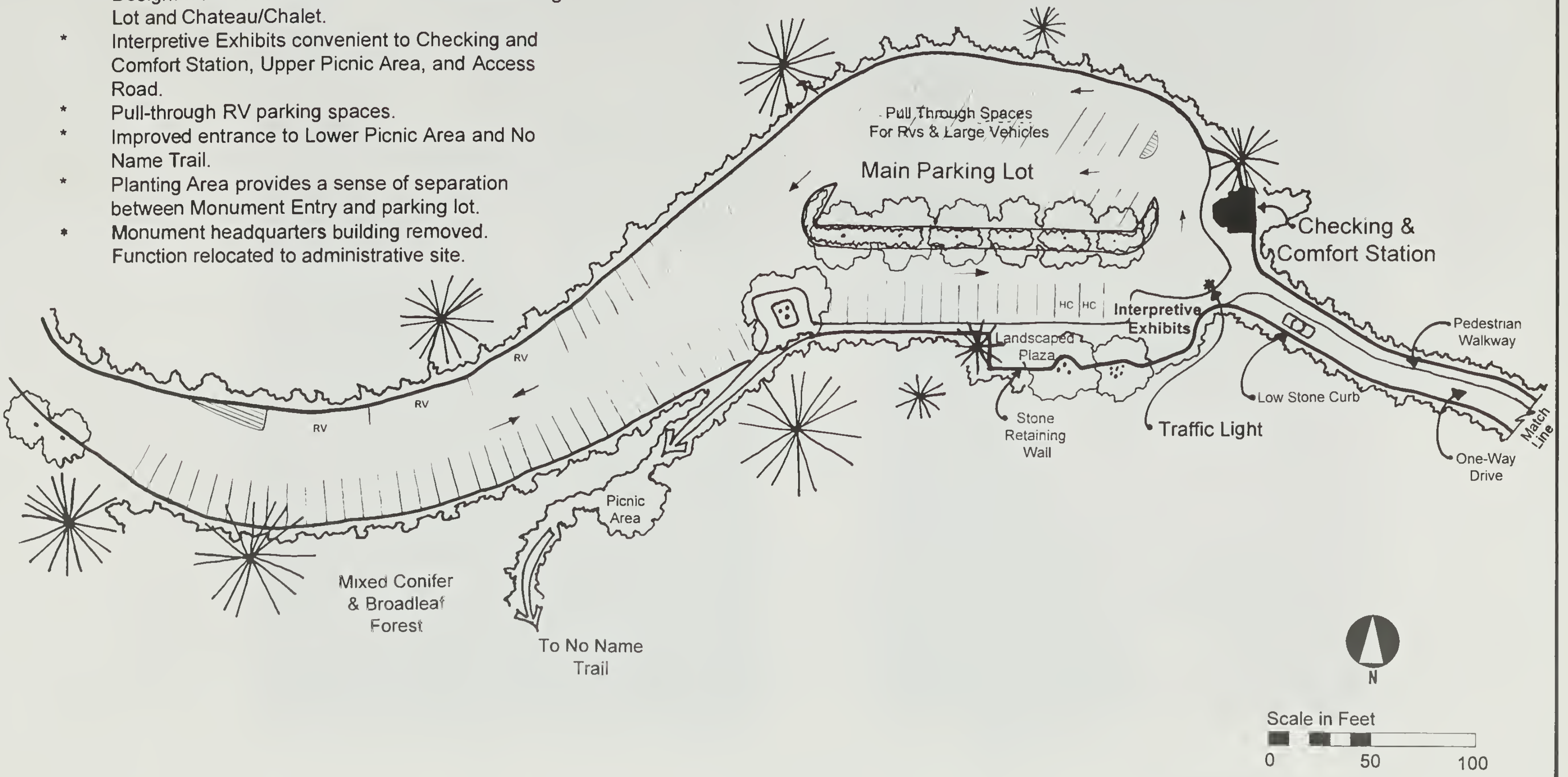
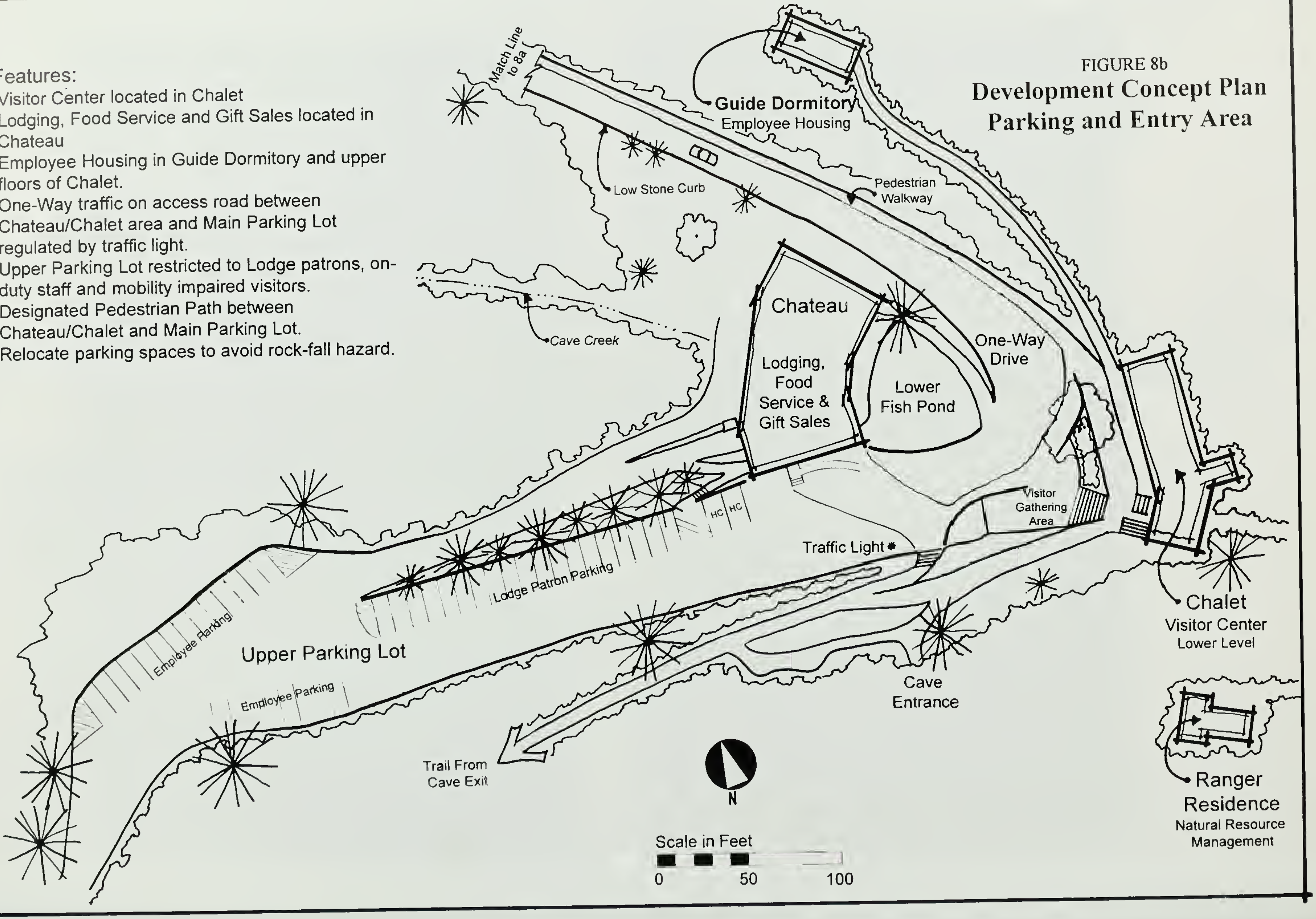


FIGURE 8b

Development Concept Plan Parking and Entry Area

Key Features:

- Visitor Center located in Chalet
- Lodging, Food Service and Gift Sales located in Chateau
- Employee Housing in Guide Dormitory and upper floors of Chalet.
- One-Way traffic on access road between Chateau/Chalet area and Main Parking Lot regulated by traffic light.
- Upper Parking Lot restricted to Lodge patrons, on-duty staff and mobility impaired visitors.
- Designated Pedestrian Path between Chateau/Chalet and Main Parking Lot.
- Relocate parking spaces to avoid rock-fall hazard.



Traffic signals would be installed on each end of drive to reduce pedestrian-vehicule conflicts

Upper parking lot would be reconfigured for lodge patrons and employees

Public use of the Monument would be monitored for impacts, and further adjustments affecting public access and use may be established as appropriate. It is acknowledged that a transition period may be necessary to accommodate the establishment of the cave tour reservation system and NPS ranger-led tours. If parking lot capacities at the Monument and the IVVC are reached on a continuing basis, then alternative strategies to accommodate Monument visitors would need to be pursued. This may include institution of a shuttle van system during peak periods.

Monument Boundary

Public forest lands between Buck Peak summit and the Monument would be added

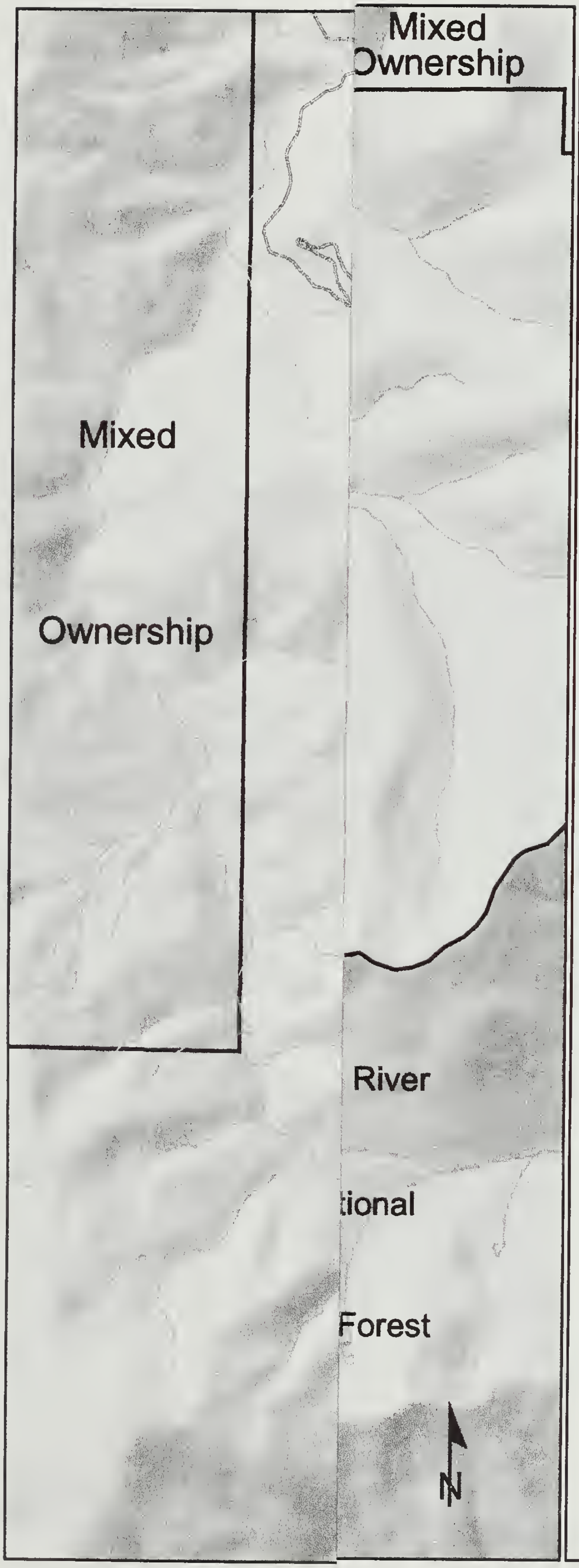
In order to protect cave ecology, surface and subsurface hydrology, forest ecology, foreground and middleground viewsheds, and the public water supply used by employees and visitors to Oregon Caves National Monument, a boundary modification would be recommended. Including the 484 acres already within the Monument, the modified boundary would encompass approximately 3,794 acres, or an addition of 3,310 acres. All lands proposed for inclusion in the revised boundary are federal lands within the SNF. No private lands are involved and no acquisition funds are needed. The transfer would include the Monument's 80 acre administrative site presently used by the NPS under an existing agreement with the USFS. (See Figure 9, Boundary Modifications: Alternative C.)

Lands to be added to the Monument include the watersheds of upper Cave Creek and upper and lower Lake Creek above and adjacent to Oregon Caves National Monument. This includes Mt. Elijah and portions of the Lake Mountain Trail to Mt. Elijah, and the Bigelow Lakes. Prior to transfer, the NPS would complete a Level I Survey to determine if hazardous wastes are present.

Through this change, greater protection would be afforded to the upper Lake Creek watershed. Since the public water supply for the Monument is located in the upper Lake Creek watershed, grazing would be eliminated as a permitted use. Human use of the watershed area would be limited to those uses that would be compatible with the protection of a public watershed. As required by the Surface Water Treatment Rule of the Safe Drinking Water Act of 1982 (reauthorized in 1996), the Monument would prepare and submit a detailed watershed protection plan stating how this protection would be achieved.

Greater protection would also be afforded to upper Cave Creek watershed as well, which is the principal water source of the River Styx and subsurface hydrological flows into the marble cave.

The boundary adjustment would incorporate the administrative site into the expanded Monument which would allow for more efficient management and protect NPS investment of construction funds needed to enhance administrative facilities.



ORCA GMP/EIS

FIGURE 9

Boundary Modifications: Alternative C

Legend

▩ Existing Park Boundary - 480 acres

▨ Proposed Park Boundary - 3310 acres

∧∨ Highway

∧∨ Streams

0 Kilometers 1

0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary
NPS: proposed park boundary

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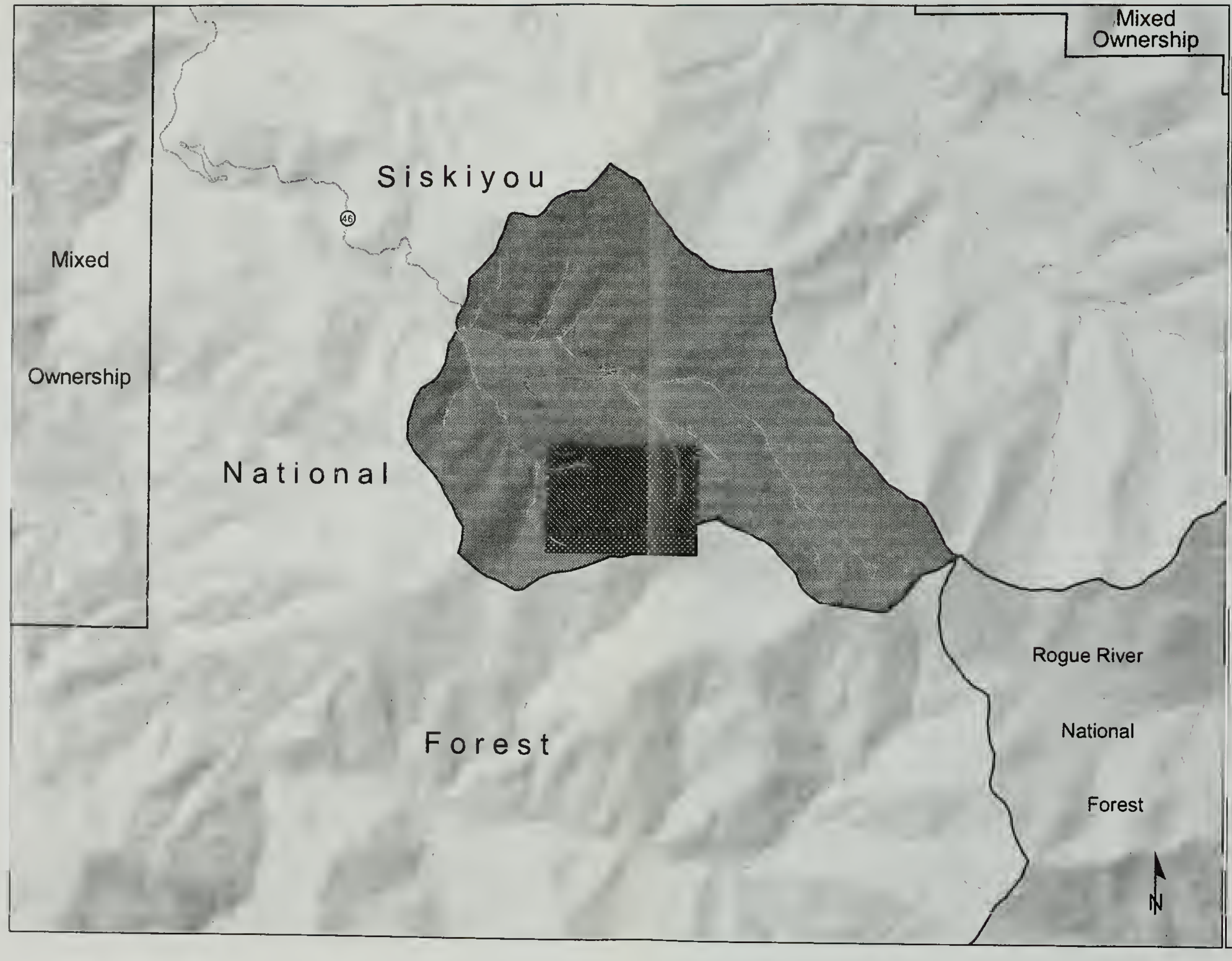
Boundary Modifications: C



ORCA GMP/EIS

FIGURE 9
Boundary Modifications: Alternative C

Legend

- ▩ Existing Park Boundary - 480 acres
- ▨ Proposed Park Boundary - 3310 acres
- Highway
- Streams

0 Kilometers 1
0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary
NPS: proposed park boundary

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Boundary Modifications: C

Finally, since the boundary change is topographically based, it would also provide greater protection for the foreground and most middleground views from the Monument's developed area and adjacent trails. This would include protection of lands within Level I Sensitivity (those viewpoints closest to Oregon Caves) of the middleground composite viewshed. (See Figure 10, Resource Values.)

In a separate minor boundary adjustment action, a total of 3.95 acres would be recommended for deletion from the Monument boundary in Cave Junction adjacent to the IVVC. (This land was authorized, but never became part of the 484 acre Monument.) This land was never acquired as part of the IVVC site and is now owned by the City of Cave Junction which proposes a water treatment facility at the site. This additional authorized land is not needed over and above the 4.03 acres currently within the Monument at the IVVC. Under this alternative, future anticipated public land needs at Cave Junction do not require that this area remain a part of the Monument, and therefore allow for deletion of this authorized area from the existing Monument boundary. For further analysis of boundary adjustment and land protection criteria, see Appendix C, Analysis of Boundary Adjustment and Land Protection Criteria.

Opportunities for Regional Cooperation

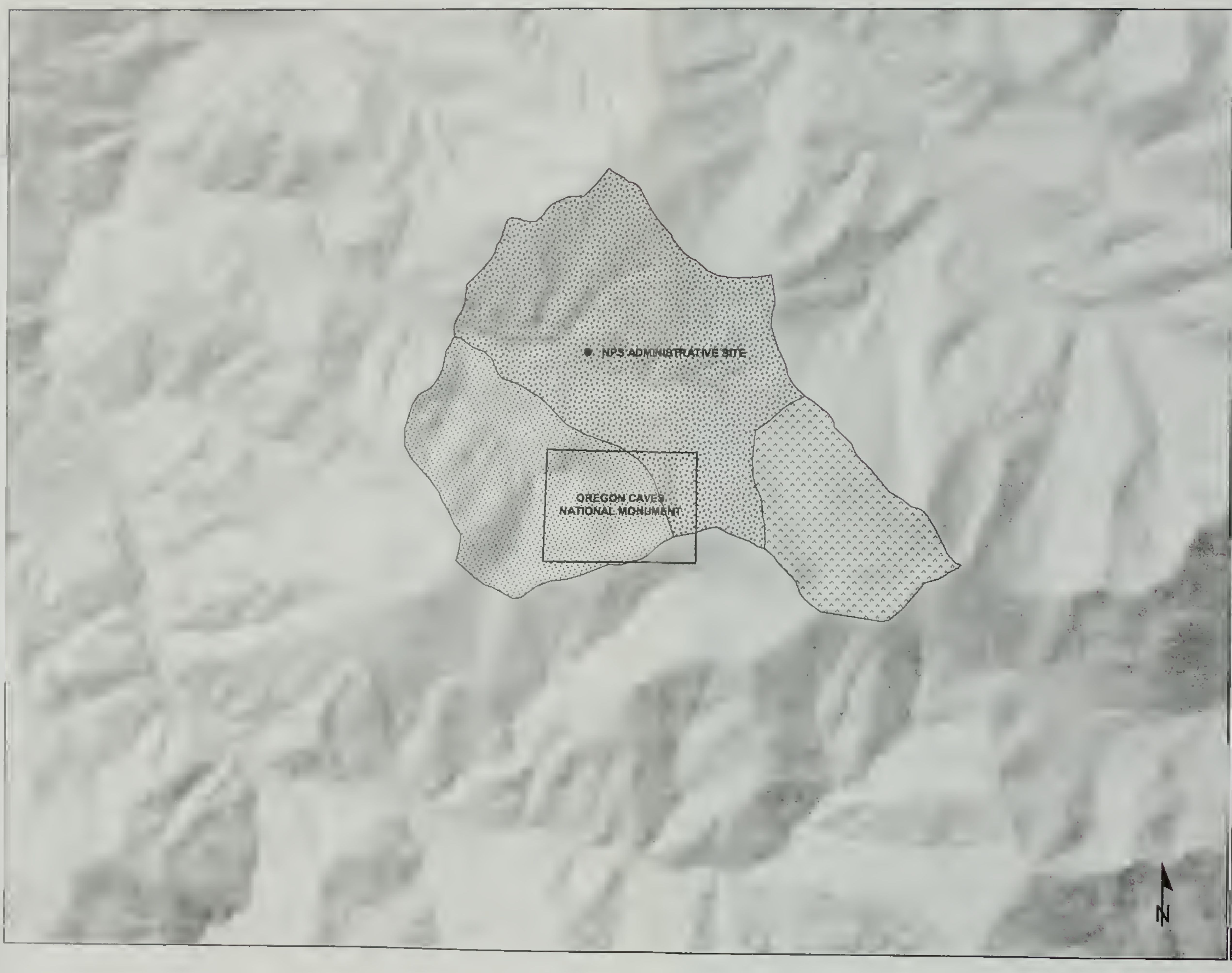
Opportunities for regional cooperation would be the same as Alternative B. In addition, NPS would work with SNF to create new agreements to include the following: 1) Provide special cave tours for SNF volunteer trail crews. 2) Develop park-to-wilderness trail systems in conjunction with wilderness areas adjacent to the Monument (for example, Red Buttes Wilderness, Siskiyou Wilderness). 3) Assist with the development of the "Coast to Caves" mountain bike trail currently being spearheaded by Del Norte County, California and Six Rivers National Recreation Area (USFS), also in California, in conjunction with SNF.

Additionally, opportunities for enhanced visitor experiences could be explored within a broader regional context to link significant and ecologically diverse natural features between the Pacific coast and the Cascade crest. This could include bicycle or automobile touring of the area. Through this broader regional perspective, Oregon Caves and the Illinois Valley would be centrally positioned to take advantage of these opportunities.

ORCA GMP/EIS

FIGURE 10

Watershed Resources



Legend

- ☐ Existing Park Boundary
- ░ Upper Cave Creek Watershed & Oregon Cave Resources
- ▒ Lower Lake Creek Watershed, Middleground Viewshed, & Applegate Marble
- ▨ Upper Lake Creek Watershed & Public Water Supply

0 Kilometers 1
0 Miles 1

Data Sources:
SISKIYOU NF: watersheds
USGS: topography, park boundary
NPS: administrative site
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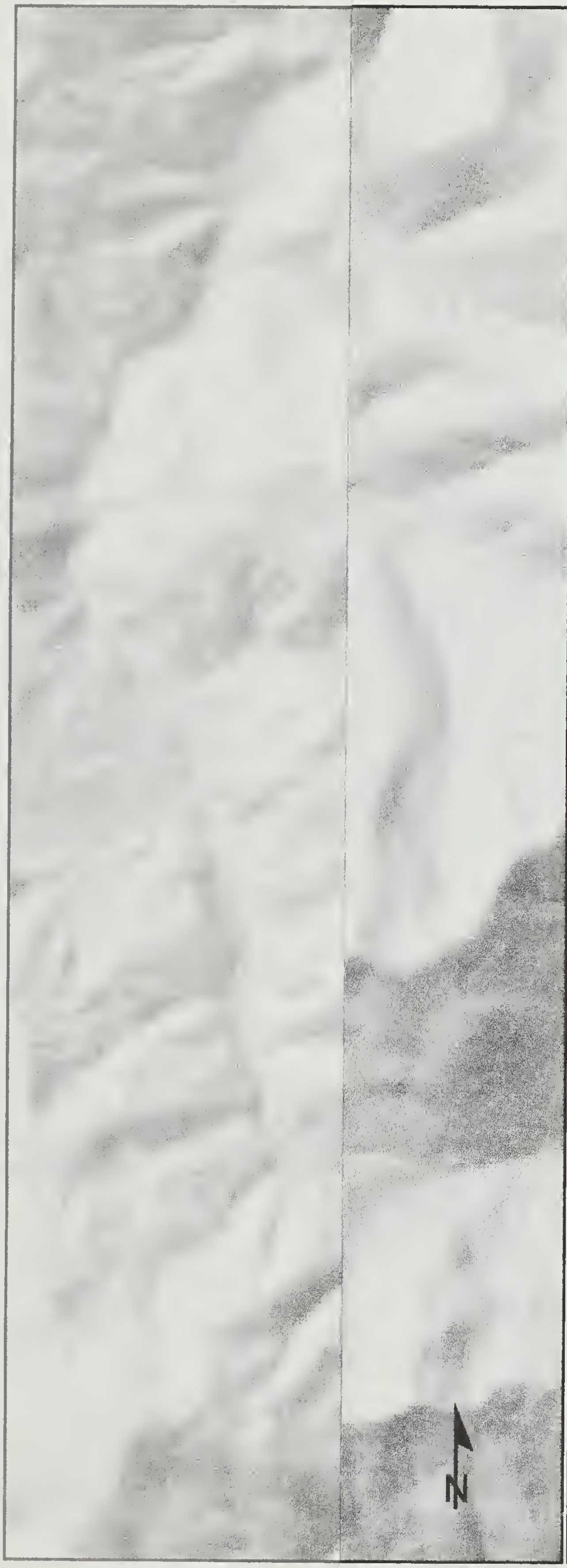
Watershed Resources



ORCA GMP/EIS

FIGURE 10

Watershed Resources

Legend

▭ Existing Park Boundary

░ Upper Cave Creek Watershed & Oregon Cave Resources

▒ Lower Lake Creek Watershed, Middleground Viewshed, & Applegate Marble

░ Upper Lake Creek Watershed & Public Water Supply

0 Kilometers 1

0 Miles 1

Data Sources:
SISKIYOU NF: watersheds
USGS: topography, park boundary
NPS: administrative site
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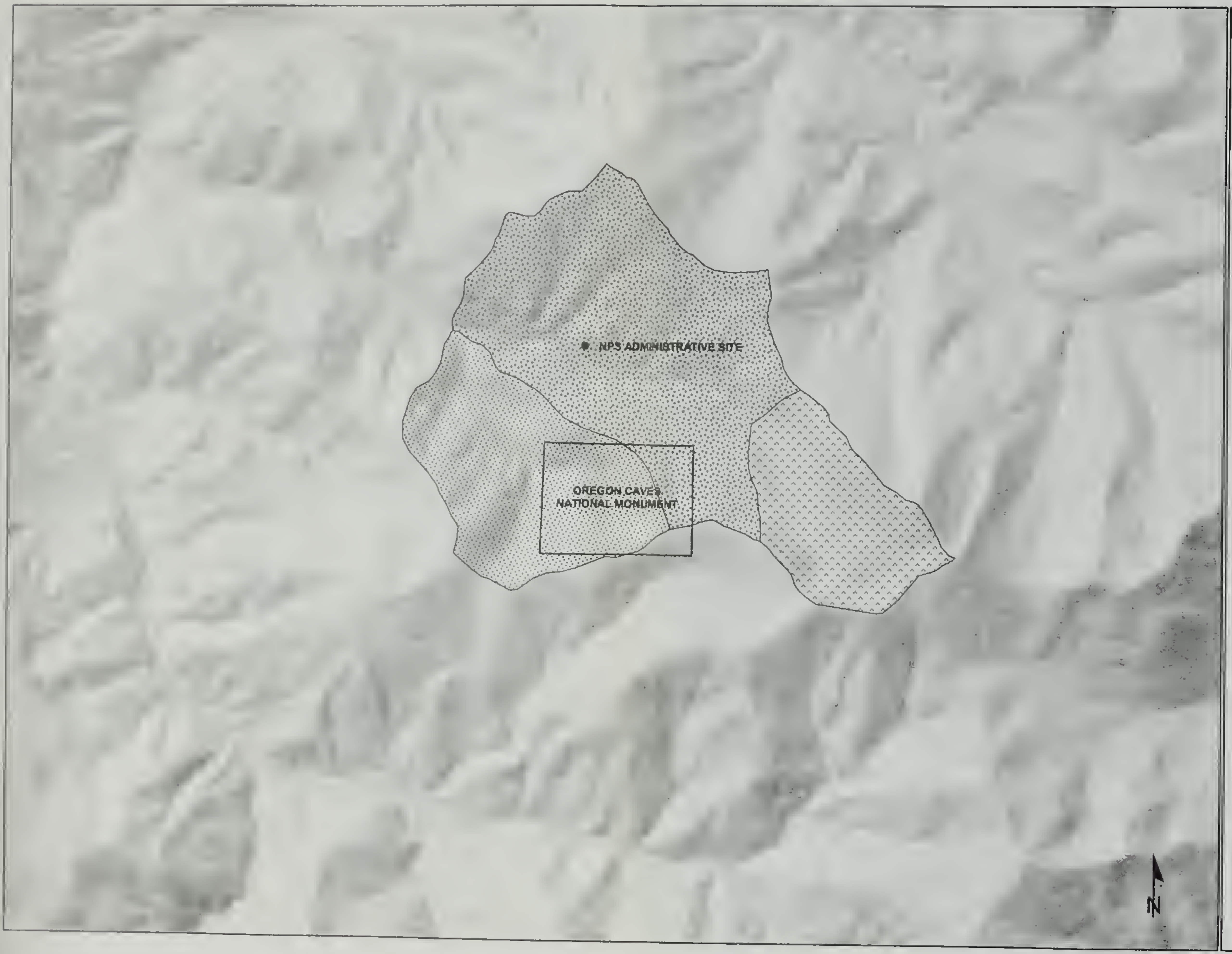
Watershed Resources

ORCA GMP/EIS

FIGURE 10

Watershed Resources



Legend

☐	Existing Park Boundary
░	Upper Cave Creek Watershed & Oregon Cave Resources
▒	Lower Lake Creek Watershed, Middleground Viewshed, & Applegate Marble
▨	Upper Lake Creek Watershed & Public Water Supply

0 Kilometers 1

0 Miles 1

Data Sources:
SISKIYOU NF: watersheds
USGS: topography, park boundary
NPS: administrative site
K:\GIS\AVPROJ\ORCA\GMPMAPS.APR
Watershed Resources

Alternative D—Increased Visitor Services and Recreation Opportunities Combined With Increased Watershed Protection

General Description of Alternative D

Alternative D provides for expanded year-round visitor opportunities. Included would be the development of a new on-site NPS visitor center and association sales area. The new visitor center would provide expanded opportunities for public education and interpretation. The staffed visitor center would be complete with exhibits, audio-visual programming, information desk, and cooperating association sales area.

Protection of the public water supply and ground water resources of the upper watershed, scenic foreground and some portions of the middleground viewsheds and much of the general forest ecology surrounding the Monument would be secured through a boundary transfer of 2,373 acres of adjacent federal land within the SNF. This would include the upper and lower watersheds of Lake Creek and the upper watershed of Cave Creek. For administrative and protective purposes, logical boundaries follow along the ridgelines to create a more complete ecologic and biologic unit.

Additionally, a 937 acre protected area within the adjacent SNF would be established north of the administrative site—portions of the lower Lake Creek watershed—to protect scenic views seen from the Monument and adjacent trails. This includes additional portions of the middleground viewshed not included within the Monument boundary.

Implementation of Alternative D would call for the NPS to enter into either a written agreement with a nonprofit institute, cooperating interpretive association or other similar entity to augment the NPS responsibility in the provision of guided cave tours at the Monument. The current range of concession provided services in the areas of lodging, food service and gift sales would be maintained under this alternative.

The NPS would construct replacement collection storage, administrative offices and additional permanent and seasonal housing in the existing administrative site. The maintenance area would also be rehabilitated. The temporary trailer replacing the Monument headquarters building would be removed adjacent to the main parking lot to make way for the construction of a new visitor center in the southeast end of the main parking lot.

The IVVC would be retained and enlarged. The IVVC would be the principal point of visitor information about Oregon Caves, the primary location to purchase cave tour tickets for upcoming tours. The IVVC would also serve as a point of departure for a peak season employee shuttle van to and from the Monument.

To help ease vehicular and pedestrian traffic between the main parking lot into the National Register historic district and the cave entrance, a one-way traffic system would be established along with a delineated pedestrian walkway on the hillside of the drive.

Management Zones

Management zoning designates where various strategies for management and use would best fulfill management objectives and achieve the purposes of the Monument. Management zoning is a tool for park planners to assign appropriate uses within specific areas of a park and to manage visitor use and resource protection towards those uses. Under Alternative D there would be three zones within the Monument.

Historic Zone

This zone would incorporate the National Register historic district of the Monument; the cave entrance; and the CCC stone steps and historic inscriptions within the cave.

Park Development Zone

Within the Monument's boundary, this zone would include the main parking lot, the upper parking area adjacent to the Chateau, the sewage galleries, water treatment facilities and Monument roads, and helipad adjacent to USFS Road 960. Also included in this zone are both existing and proposed improvements to Monument housing, maintenance area, and the administration and collection storage areas located at the administrative site. The IVVC located in Cave Junction also would be in the Park Development zone.

Regarding the lands proposed for addition to the Monument from the SNF, the Park Development Zone would include USFS Road 960 for fire access and public access to the Town of Williams and USFS Road 4611/070. Current USFS Road 4614/048 also would be included in the Park Development Zone and would remain open for public access and use. Through interagency agreement, the USFS would be requested to continue maintenance of this short section of road through the expanded Monument.

Natural Zone

The Natural Zone would include two subzones: the Cave and Surface Subzones. The Cave Subzone would include all known cave resources, including the trail within the cave. The Surface Subzone would include the remaining land area with the current and expanded Monument, including the forested slopes above the cave, and the adjacent Cave Creek and Lake Creek watersheds. Also included in the Natural Zone would be all hiking trails, including remnants of the horse trail, and portions of the trail to the Town of Williams that are included within the enlarged Monument boundary.

All lands added to the Monument boundary which do not involve former national forest roads listed as part of the Park Development Zone would be included within the Natural Zone of the Monument.

Natural Resource Management

Consumptive uses such as mining and grazing would be excluded from within the Monument under existing statutes and regulations.

Fire

In order to restore natural conditions within the Monument, fire would continue to be introduced in the Monument. This is necessary to reduce catastrophic fire risk to human life, property, designated resources, and to reestablish native vegetation types.

Under Alternative D, the transfer of additional acreage would change the complexity of the fire management program. A fire program (FIREPRO) budgeting analysis would be needed to address future fire funding for the Monument. The analysis would redefine values at risk and add the needed complexity to the present day analysis. Expertise would be needed to implement an approved fire management plan as well as supervise an additional seasonal ranger who would assist in initial attack, implementing fire prevention programs, and emergency presuppression programs.

An enhanced fire cache would be developed in the maintenance area concurrent with the relocation of the parking/storage area for the wildland fire engine. A secondary fire cache would be developed in the existing garage to the south of the Chateau.

The fire hazard to the administrative site and the Chateau is still high and a balanced and active fuels management program is needed in order to protect Monument resources while still allowing fire to play an ecological role where appropriate. Management of fuels in areas that have been previously treated would be required due to the natural succession of vegetation that takes place. Management activities should be planned every three to five years as an on-going program in order to maintain resource protection needs. It is important to recognize why a "sustainable" fuels program is needed in order to avoid loss of capital investment by the occurrence of just one catastrophic fire.

Cultural Resource Management

At the administrative site, the quonset hut, currently used for collection storage, would be removed and replaced by a permanent structure that meets NPS standards for collection storage. The Chalet would be retained as a gift shop for the concessioner, with the exterior of the building retained in its historic appearance. The upper level of the Chalet would be converted into apartments for institute or cooperating association employees. The Chateau, a NHL, would be retained for its historic use as a lodge and coffee shop/restaurant. The Guide Dormitory would be retained for employee housing use by the concessioner. The historic Checking and Comfort Station (kiosk and restroom) adjacent to the main parking lot would be preserved. The historic Ranger Residence would continue to be used for a park field office.

All uses of buildings within the National Register historic district by the NPS, institute, or nonprofit would be governed by standards which protect the historic integrity of the buildings. Rehabilitation and maintenance work by the NPS, concessioner, institute, or cooperating association on historic buildings within the Oregon Caves Historic District would be performed in accordance with the Secretary of the Interior's Standards for Archeology and Historic Preservation (FR 48:44716-40). Compliance in this area would continue to be monitored by Monument staff.

Interpretation and Visitor Use

Under Alternative D, Oregon Caves National Monument would be available to the public for regularly scheduled guided cave tours the year-round. The cave guide service would be operated by a private nonprofit institute or similar organization. In addition, NPS staff would also be available to conduct special cave programs, and provide other special interpretive programs at the Monument, including educational programs with changing content and formats.

Basic public orientation, information, and on-site interpretation of the cave and other Monument resources would be met by constructing a new Monument visitor center in a portion of the main parking lot. The visitor center would be staffed, and include both static exhibits, interactive displays, and a moderately-sized audio-visual theater space for multi-media presentations. An orientation audio/visual program would be provided for visitors. The theater would also serve as a classroom for staff-led environmental education programs. A staffed desk and cooperating association sales area would also be included in the center. It is expected that the visitor center area would serve as a meeting place for commencing cave tours. Visitors would then proceed to walk up the drive to the cave entrance.

During the summer season, extended interpretive programming may include evening programs, morning and afternoon nature walks, special cave tours, weekend campground programs at the Grayback Campground, cave guide seminars, and a "wild" cave tour. During the spring and fall seasons, special topic cave tours, tours of the National Register historic district, daily nature walks, guide seminars and weekend NPS guided Bigelow Lakes hikes would be included. The NPS would provide personal and non-personal interpretation of the forest/surface resources of the Monument, including the ecological and biological values in this area, as well as the geological story.

Enhanced interpretive services would be provided for non-English speaking visitors under this alternative. Additionally, some interpretive programming would be designed for special populations.

With administrative offices moving to the administrative site, the area adjacent to the Checking and Comfort Station would be available for the construction of the new visitor center. Interpretive office space would be established in the new visitor center.

The IVVC would remain a key point of contact for visitors, providing important information and orientation concerning the Monument. The interpretation plan for the center would be implemented under this alternative. Visitor information services would be enhanced at the existing building. Permanent exhibits would be added. Funding would be sought to enlarge the building to provide meeting room space, and space for a small Chamber of Commerce office and information about other area attractions and visitor services.

The NPS would work with the USFS, the Illinois Valley Chamber of Commerce and other IVVC partners to seek various funding sources to help build the needed addition to the IVVC. The IVVC would also be the principal place for visitors to make a cave tour reservation, and to purchase tour tickets. Outdoor signs at the IVVC, and staff there would encourage visitors to purchase cave tour tickets before proceeding to the Monument. NPS staff, augmenting others at the IVVC, would include ticket sales for cave tours and a visitor use assistant during the summer peak season. Other IVVC staff would provide this function during the non-peak season. Visitor orientation and information services would be enhanced at the existing building by adding permanent exhibits; space would remain available to provide information about other area attractions and visitor services in coordination with IVVC partners.

Recreation Resource Management

Various recreational activities would be available to visitors on 2,373 acres within the expanded boundary, and the 937 acre protected area. Additional non-motorized recreational opportunities, such as hiking, nature walks, and cross-country skiing and snowshoeing, would be available to Monument visitors with the transfer of these lands to the Monument. Snowmobile use would be permitted on those through roads which provide direct access to adjacent USFS and other lands where snowmobile use is permitted.

The upper Lake Creek watershed is approximately 730 acres (25.6% of the total boundary expansion). Since the public water supply for the Monument is located here, certain uses may be restricted for both humans and animals. Animal use would be restricted to horse use on horse trails. The USFS Road 070 spur would be closed within the area and rehabilitated. Hikers would continue to use the Lake Mountain Trail to Mt. Elijah which is on the watershed divide and NPS guided hikes could occur to Bigelow Lakes.

No overnight campground facilities would be considered by NPS. Adequate campground space is available at USFS Grayback and Cave Creek campgrounds. The NPS would work with the USFS to maintain the campground programs and amphitheatre setting at Grayback Campground. Audio/visual storage and use would be provided at the amphitheatre. A formal agreement with the USFS for NPS presentation of interpretive programs would be sought.

The picnic areas at the Monument would be upgraded and expanded. Benches and rest areas would be provided on the Cliff Nature Trail. The benches would be compatible with the historic CCC benches.

The Monument would work to establish an interconnected system of trails with the adjacent RRNF and SNF. To provide movement through the area by horse users, one or more trails would be available to horse use as appropriate.

No hunting is permitted within the existing Monument boundary. According to NPS policies, hunting restrictions would be extended onto lands added to the Monument.

Scenic Resource Management

The transfer of lands to the Monument would extend scenic viewshed protection to include the foreground viewshed, and portions of the middleground viewshed into the forest canopy and ridgetops as seen from the Monuments viewpoints, including the National Register historic district and principal viewpoints along adjacent trails. Under Alternative D, for foreground views, 100% of Level I Sensitivity areas would be protected, along with 67% of Level II Sensitivity areas. For middleground views, 62% of Level I Sensitivity areas would be protected and 37% of Level II Sensitivity areas. (Refer to the Visual Analysis section, The Affected Environment chapter.)

In general, Alternative D would provide the similar total viewshed protection as Alternatives B and C, with some additional protection of the foreground viewshed as seen from the Monument over Alternative B, but less than Alternative C. This is because the area proposed for addition to the Monument under this alternative would preclude timber harvesting activities which would be restricted, but not totally precluded, under Alternative B. Alternative C protects an even greater area where timber harvesting activities would be precluded. This alternative would provide protection from future visual impacts (predominately clearcutting and road building) as seen from important viewpoints within the Monument and on adjacent trails. Viewpoint #1,at the main parking lot, is probably the most visited viewpoint. All foreground and middleground views from this critical viewpoint are either included within the Monument, the proposed 2,373acre addition, or the 937 acre protected area proposed under this alternative.

Park Facilities

Monument operated facilities would include administrative offices, collection storage, staff housing, and a maintenance area located at the administrative site, a new visitor center located in a portion of the main parking lot, and the IVVC located in Cave Junction.

The NPS would acquire from the concessioner all existing possessory interest in all Monument buildings according to the terms of a new concession contract, within the policies prescribed by the NPS.

A new visitor center would be constructed at the southeast end of the main parking lot. The visitor center would be a staffed, full-service center, with both static exhibits, interactive displays, and a moderately-sized theater for multi-media presentations. A cooperating association sales area would also be incorporated into the structure. The temporary trailer serving as the Monument headquarters building adjacent to the parking lot would be removed to help make room for the construction of the new visitor center, and Monument headquarters functions would be moved into the new visitor center. However, the historic Checking and Comfort Station adjacent to the main parking lot would be retained.

After construction of the new visitor center, the remaining space in the existing parking lot would be reconfigured. Dependent upon visitor use patterns, parking lot turnover rates, and future visitation, a new remote satellite parking area located either at the helispot (USFS Road 960) or at the administrative site may be needed to accommodate peak period demand. Park staff would monitor parking lot use. If consistent overcrowding is experienced, then a satellite parking area may need to be considered within the expanded Monument. A shuttle van also would be needed to take visitors from the satellite parking area to the visitor center and drive entrance.

The lower level of the Chalet would remain a gift sales area for the concessioner. The upper level of the Chalet would be rehabilitated to provide housing for employees of the organization providing cave tours.

The two rental trailers currently used for seasonal housing would be removed and replaced with two duplex housing units to serve seasonal and/or permanent staff needs. The existing single family housing unit would be retained. The quonset hut, currently used for fire cache, collections, storage, interpretation, and garage space for the fire truck, would be replaced by a permanent building. The NPS maintenance area would also be rehabilitated by adding a garage bay to house the fire truck to provide covered storage space for equipment and materials.Additionally, the maintenance yard area would be reconfigured to provide covered storage space for equipment and materials. One bay would also be added to the garage area to house the fire truck.

The IVVC would be retained and enlarged. The IVVC would be the initial point of visitor contact for Oregon Caves—a place to obtain general information about the Monument—and would serve as the primary location to purchase cave tour tickets for upcoming tours. Information signs for the IVVC would be improved and include information on ticket sales, age and height restrictions for cave tours, and vehicle limitations of Highway 46.

The adequacy of existing water and sewage treatment systems for employee and visitor use (both quantity and quality) would be investigated for projected future increases in use.

Existing trails would be maintained. The Big Tree, No Name, Limestone, Cave Creek and portions of the

Lake Mountain Trail to Mt. Elijah would be maintained as part of the trail system within the Monument. Maintenance and management of the section of the Lake Mountain Trail to Mt Elijah Trail within the SNF to the top of the peak would be coordinated with the USFS by a formal written agreement.

The NPS would maintain roads within the expanded Monument. This would include current USFS Road 960 for fire access, as well as to allow public access to and from the Town of Williams and access to USFS Road 4611/070. Through interagency agreement, the USFS would be requested to continue maintenance of a short section of USFS Road 4612/13 through the expanded Monument, which would remain open for public access and use. The USFS Road 070 spur into the upper watershed of Lake Creek would be closed to vehicular use to protect the upper Lake Creek drainage and Bigelow Lakes. Hiking trails would allow for continued visitor access into this area.

Wherever possible, all above-ground utility lines would be buried for maintenance, visitor safety and aesthetic reasons.

Development Cost Estimates for Implementing Alternative D

Administrative Area (collection storage, administrative offices, staff housing, maintenance area, rehabilitation, utilities and roads)	$ 1,330,000
New Visitor Center (construction)	$ 3,230,000
Nonprofit Association Facilities (rehabititation)	$ 825,000
Illinois Valley Visitor Center (addition, exhibits)	$ 100,000
Remote Parking Area and Comfort Station (construction)	$ 590,000
Total Estimated Net Development Costs (FY 1998 Dollars)	$ 6,075,000

Park Operations and Staffing

The NPS would continue to use the present administrative site for housing, maintenance and other administrative purposes. Operational staffing needs would support Monument administration, maintenance, interpretation, resource management, and visitor and resource protection. Additional interpretive staff over Alternative B would be required under this alternative because of a greater emphasis upon environmental education/outreach programs and other educational activities. A year-round visitor center would also need to be staffed with rangers or other employees. Additional maintenance, resource management and protection staff would be needed because the expanded acreage of the new Monument also results in additional trail maintenance, resource management and other operational needs. This alternative also proposes additional interpretive campground programs at area public campgrounds.

NPS would maintain a visitor protection presence on Monument grounds.

The Monument would have 20 authorized FTE staff under this alternative and an average of 30 staff positions including permanent, permanent subject to furlough, seasonal, and temporary positions.

Total Staffing Needs Under Alternative D

Administration	Maintenance	Interpretation	Resource Management	Total	FTE
3 Permanent	3 Permanent	5 Permanent	2 Permanent	13	13.0
1 Seasonal	3 Seasonal	8 Seasonal	3 Seasonal	15	6.0
0 Term	2 Term	0 Term	0 Term	2	1.0
4 Total	8 Total	13 Total	5 Total	**30**	**20.0**

Estimated Operating Costs (FY 1998 Dollars)

Operating Base:	$ 541,000
Administration/Resource Management Enhancement:	$ 49,000
Additional Resource Management (New Area):	$ 86,000
Additional Maintenance (New Area):	$ 22,000
New Visitor Center Maintenance and Operation:	$ 202,000
Total	**$ 900,000**
Difference in Operating Cost Between Current Base (Alternative A) and Alternative D:	$ 359,000

Fees

There would be no charge to enter the Monument. When an organization is conducting cave tours, tour fees would be retained and included as part of their gross revenues. In accordance with NPS-32, any net proceeds over and above operating expenses would be expected to be returned to the Monument to benefit interpretation and resource management. When the NPS conducts additional tours to the regular guided cave tours or guided trail nature walks, the NPS would have the option of charging for such interpretive services.

No fees for parking at trailheads would be charged within the expanded Monument.

Concessions

Visitor services, including lodging and food service, would continue to be provided to the public in the historic Chateau by a contracted concessioner. Concession gift sales would be retained in the Chalet. The Guide Dormitory would remain available to the concessioner for employee housing, and the upper floor of the Chalet would be available to the tour operator as space for employee housing.

The Chateau would continue to provide space for lodging and food service. The Chalet would provide space for concession gift sales and sundries. A gift sales mission statement would be developed to guide the scope and scale of the gifts and other merchandise that is offered to the public. The upper level of the Chalet would be available for tour operator employee housing, and the Guide Dormitory would continue to be available for housing concession employees.

The NPS would proceed to acquire all existing possessory interest held by the concessioner in all Monument buildings as prescribed by NPS policy.

Monument Hours and Seasons of Operation

The Monument would remain open to public use the year-round under Alternative D, and guided cave tours would also be available throughout the year as demand warranted. Lodging and food service would also be available year-round.

Proposed maximum hours of guided cave tour operation per day:
- 12 hours maximum in the summer season
- 11 hours maximum in the spring and fall seasons
- 9 hours maximum in the winter season

Environmental education programs would be provided in both the spring and fall seasons. Expanded interpretive programs would be provided during the spring, summer and fall.

Shuttle Systems

A shuttle service for NPS, concessioner, cooperating association, and institute employees is proposed under this alternative in order to help alleviate peak season parking shortages at the Monument, reduce the total number of private employee vehicles, and to encourage energy conservation. The employee shuttle would leave each morning from the Cave Junction area and return in the late afternoon or early evening. Depending upon demand and work schedules, the shuttle could make more than one run per day. The employee shuttle would also stop at the administrative site. If a satellite parking lot is established, then shuttle service between this lot and the main parking lot for the general public would be needed.

Parking, Access and Circulation

The general public would continue to access the Monument from State Highway 46 and be directed to park in the main parking lot. The State of Oregon would retain the right-of-way for State Highway 46 as it currently exists under agreement with the SNF. The NPS would become the managing authority for future easements of right-of-way extensions within the expanded boundary, but no additional permits or agreements would be required for the existing highway.

No general visitor vehicular access would be permitted onto the drive beyond the main parking lot. Except for permitted vehicles of visitors with disabilities, all day-use visitor vehicles would be eliminated from the historic district under this alternative. Lodging patrons and visitors with disabilities would be assigned parking spaces adjacent to the Chateau. Delivery vehicles would also be permitted on the drive, but would be encouraged to make deliveries during non-peak hours. A shuttle van would be established to transport concession, cooperating association, institute, and NPS employees to and from the Monument, the administrative site and Cave Junction under this alternative. On-duty staff would also be assigned parking, and employee access to the upper parking lot would be restricted to non-peak hours to help minimize conflicts between vehicles and pedestrians. A few spaces for official U.S. government, institute, cooperating association, and concession employees vehicles would also be designated near the Chateau as part of the employee parking area.

With no general visitor vehicular access permitted onto the drive beyond the main parking lot, the current paved drive into the historic district and cave entrance area would be modified into a one-way drive through the use of stop lights at each end. A dedicated walkway for pedestrian use would be delineated along the hill-side edge of the drive to facilitate pedestrian travel between the lower parking lot and the cave entrance and visitor center.

With the construction of the new visitor center in the main parking area, an overall reduction in the total number of parking spaces available to the visitor would be expected. A study of the parking lot turnover rate would ascertain whether a satellite parking area would be needed to replace those spaces lost by the construction of the new visitor center. An overflow remote or satellite parking area could be considered within the expanded Monument to accommodate peak season overflow demand. If a satellite parking lot was constructed, a shuttle van service would most likely be required to provide the public with access between the remote lot and the new Monument visitor center.

Carrying Capacity

In order to provide for the protection of cave resources and an optimal visitor experience the following carrying capacity targets for Oregon Caves would be established as the new standard for public use and access to the cave, and as the upper limit for both NPS and contractor operators concerning the maximum use of the cave for guided tours, based upon the optimum model following.

The proposed carrying capacity for Alternative D is as follows:
- Tour length: varied by nonprofit organization guides
- Group size limit: 14 persons maximum per tour group, plus guide
- Group size minimum: one person, plus guide
- Target interval between tours: 15 minutes
- Target maximum number visitors per day: 700 persons

Other capacities:
- Main parking lot: estimation of 55 spaces after construction of the new visitor center
- Upper (Chateau) parking lot: 48 spaces including 2 spaces for visitors with disabilities
- Illinois Valley Visitor Center parking lot: 30 spaces including 4 RV spaces and 2 spaces for visitors with disabilities

Public use of the Monument would be monitored for impacts, and further adjustments affecting public access and use may be established as appropriate. It is acknowledged that a transition period may be necessary to accommodate the establishment of the cave tour reservation system and institute-led tours. If parking lot capacities at the Monument and the IVVC are reached on a continuing basis, then alternative strategies to accommodate Monument visitors would need to be pursued. This may include institution of a shuttle van system during peak periods.

Monument Boundary

A boundary modification is proposed in order to protect cave ecology, surface and subsurface hydrology, forest ecology, the public water supply to the Monument, and foreground and portions of the middleground views as seen from the Monument. This boundary change would result in the transfer of some 2,373 acres to the Monument by including lands currently within the SNF. The north boundary of this land transfer is the north section lines of section 9 and 10, the northern limit of the original 1907 withdrawal. This acreage includes the 80 acres already set aside for NPS administrative use under an existing cooperative agreement with the USFS. Additionally, a 937 acre protected area within the adjacent SNF would be established north of the administrative site—the lower Lake Creek watershed—to protect scenic views seen from the Monument and adjacent trails. (See Figure 11, Boundary Modifications: Alternative D.)

All land to be included is already in public ownership managed by the SNF. No acquisition funds are needed.

Lands to be added include upper watersheds of Cave and Lake Creeks and portions of the lower watershed for Lake Creek. This includes Mt. Elijah and the Bigelow Lakes area. Prior to transfer, the NPS would complete a Level I Survey to determine if hazardous wastes are present.

Through this change, greater protection would be afforded to upper Lake Creek and upper Cave Creek watersheds and portions of the lower Lake Creek watershed. Since the public water supply for the Monument is located in the upper Lake Creek watershed, grazing would be eliminated as a permitted use. Human use of the watershed area would be limited to those uses that would be compatible with the protection of a public watershed. As required by the Surface Water Treatment Rule of the Safe Drinking Water Act of 1982 (reauthorized in 1996), the Monument would prepare and submit a detailed watershed protection plan stating how this protection would be achieved.

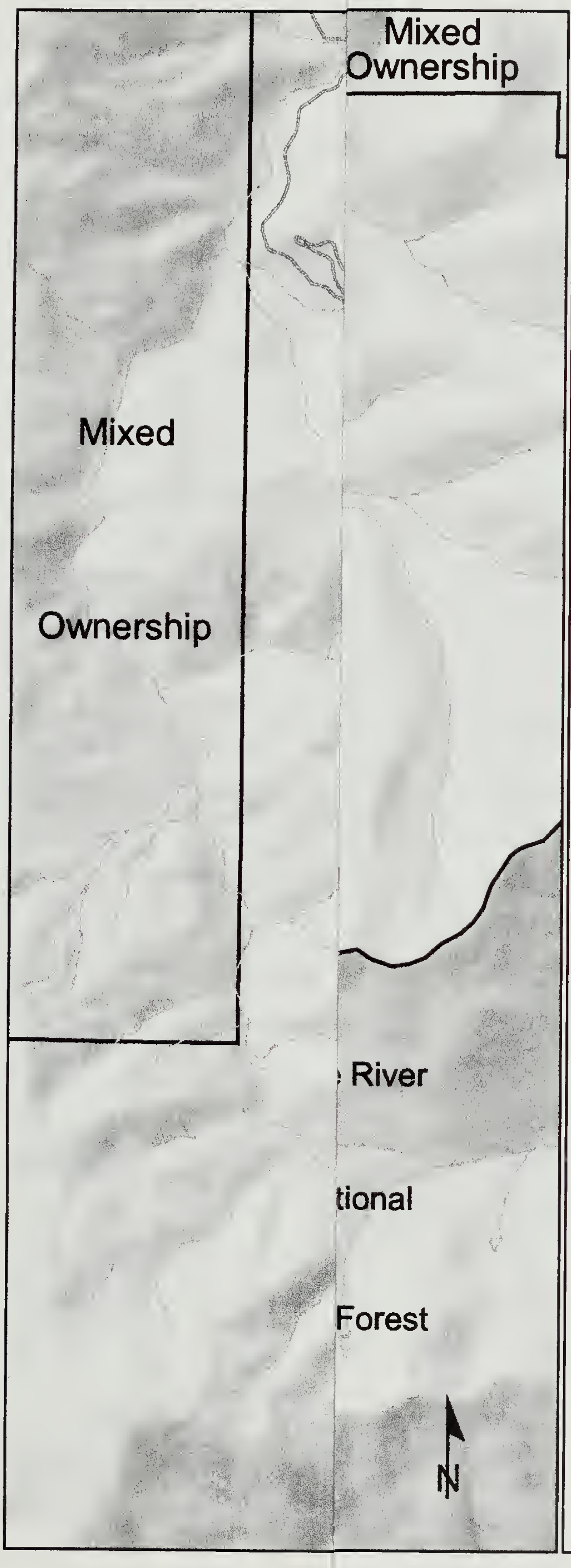
In addition to a proposed boundary change under this alternative, an adjacent 937 acre protected area within the adjacent SNF, involving the lower Lake Creek watershed, is proposed. This protected area would continue to be managed by the SNF in cooperation with the NPS. The NPS would request the USFS, through a formal written agreement, to assist in the protection of the middleground viewshed as seen from several of the Monument viewpoints. In order to protect Level I Sensitivity-Middleground composite viewshed (refer to Viewshed Analysis in the Affected Environment chapter) it would be recommended that the forest canopy within the viewshed be retained.

It would be further recommended that any timber harvesting permitted within the protected area would be managed under USFS guidelines for full visual retention as seen from viewpoints within the Monument. Full visual retention requires that management activities be conducted in such a way that they are completely subordinate to the natural character of the landscape, and are not distinguishable to the casual observer. In addition, timber would be harvested to allow for a natural ecological succession to a climax ecosystem. This would result in no harvesting of over 20% of base area based upon a predetermined base year. (See Forest Service Bulletin 201.) Restrictions would be placed on certain logging activities and additional road building, with prohibitions placed on grazing. This area would also be withdrawn and closed to mineral entry, including mineral leasing, but subject to valid existing rights.

In a separate minor boundary adjustment action, a total of 3.95 acres would be recommended for deletion from the Monument boundary in Cave Junction adjacent to the IVVC. This land was never acquired as part of the IVVC site and is now owned by the City of Cave Junction which proposes a water treatment facility at the site. This additional authorized land is not needed over and above the 4.03 acres currently within the Monument at the IVVC. Under this alternative, future anticipated public land needs at Cave Junction do not require that this area remain a part of the Monument, and therefore allow for deletion of this authorized area from the existing Monument boundary.

Opportunities for Regional Cooperation

Opportunities would be the same as Alternative C.



ORCA GMP/EIS

FIGURE 11

Boundary Modifications: Alternative D

Legend

- ▩ Existing Park Boundary - 480 acres
- ▨ Proposed Park Boundary - 2373 acres
- ░ Protected Area (USFS) - 937 acres
- Highway
- Streams

0 Kilometers 1

0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary
NPS: proposed park boundary, protected area

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Boundary Modifications: D

ORCA GMP/EIS

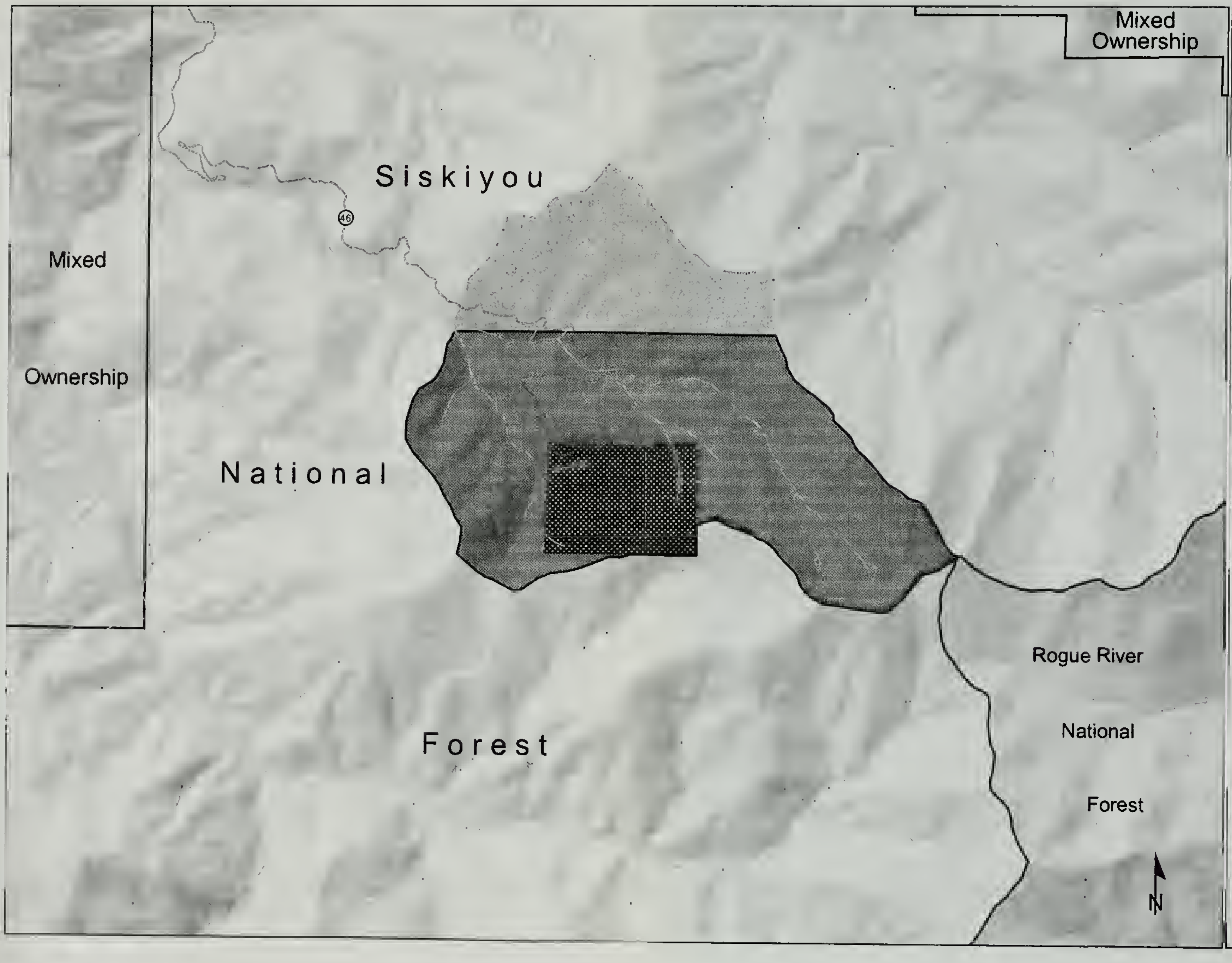

FIGURE 11
Boundary Modifications: Alternative D

Legend

▩ Existing Park Boundary - 480 acres
▨ Proposed Park Boundary - 2373 acres
░ Protected Area (USFS) - 937 acres
Highway
Streams
0 Kilometers 1
0 Miles 1

Data Sources:
Siskiyou NF: Siskiyou NF Boundary, highway, streams
USGS: topography, park boundary
NPS: proposed park boundary, protected area

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Boundary Modifications: D

Actions Considered but Rejected

The following options were considered but rejected during formulation of the alternatives for the reasons noted below:

1) The Chateau operated by a nonprofit as a conference and retreat center in shoulder seasons and a hotel in peak—While the notion of a not-for-profit operator of the Chateau does have merit for future consideration if the concession lodging services are not financially viable in the future, operation of a conference and retreat center would not be consistent with the specific purposes for which the Monument was established. An exception to this would be if the Chateau was used during non-peak periods in conjunction with environmental education classes about Oregon Caves, the surrounding Siskiyou ecosystem, or other related themes.

2) Disperse Monument collections to other NPS areas or other sites—The concept of turning to other NPS units, or other sites, for the storage and administration of the Monument's collection of cultural resource artifacts, objects, and printed material was considered and rejected because of the limited extent of the Monument's collection, and the advantage of having the collection in close proximity to Monument staff for research purposes, and public display in rotating or special exhibits.

3) Drilling water wells for potable water use—Ground water sources have been considered in the past. Hydrogeologic conditions are not favorable for obtaining groundwater supplies within the Monument or surrounding area, primarily due to the geologic formations (refer to The Affected Environment chapter). Future drilling is not recommended due to the low probably of obtaining more than one gallon per minute from a well. In 1977, attempts at the Monument were made to drill horizontal wells in several areas where seeps indicated a higher probability of intersecting fractured bedrock. Five horizontal wells were drilled all of which yielded less than five gallons per minute. Also, prospective drilling sites are limited due to extremely steep and rugged terrain. It is reasonable to conclude that Oregon Caves National Monument would always be dependent on surface water supplies.

4) Build additional seasonal housing in administration area (in addition to the two duplexes) instead of renovating upper level of the Chalet—This concept was rejected for two reasons. First, additional housing development at the administrative site would disturb existing undeveloped land, resulting in greater environmental impacts. Secondly, constructing additional new seasonal housing when space is already available in the upper level of the Chalet would not be as cost effective a solution. That is why in both Alternatives B and C where the lower level of the Chalet is converted for use as a visitor center, that the upper level of the Chalet is renovated for seasonal housing use, which is consistent with its historical use.

5) Operating the Chateau and dining room as a bed and breakfast (no noon or evening meals) but keeping the coffee shop open to the general public during peak hours—As long as the concessioner makes food services available to the general public during peak daytime hours at the coffee shop and/or dining room area of the Chateau, operation of the Chateau as a Bed and Breakfast type operation with no evening meal service is an option already available to the concessioner and could be implemented as part of Alternatives A, C, or D.

6) Expansion of the boundary to the south of the present Monument boundary—Adding land to the south of the present Monument boundary (or south of any of the proposed alternative boundaries), would protect more

of the rare and botanically productive serpentine soils, as well as incorporate part of the Limestone Trail into the Monument. However, at this time no studies have been done to identify whether or not there is any subsurface hydrological connection between Cave Creek and Limestone Creek watersheds, which in turn may impact the hydrological resources of the cave. In addition, land to the south does not fall within the Lake Creek watershed and thus land management actions within it do not affect the Monument's public water supply. Nor is this watershed within view of the primary visitation area (the National Register historic district, Park Development Zone, or Cliff Nature Trail).

7) Rerouting trails to keep them within the Monument boundary—Consideration was given to relocating trails so that they are wholly contained within the Monument boundaries. Given the steep topography of the area and the value of connecting to other trails in the area, this idea was rejected.

Summary of Actions for Each Alternative

Actions	Alternative A	Alternative B	Alternative C	Alternative D
Natural Resources				
Use of Ranger Residence for natural resource management offices	X	X	X	X
Monitor use level in cave/inventory cave biota	X	X	X	X
Seasonal cave closures to protect cave resources		X	X	
Inventory/monitor surface flora/fauna	X	X	X	X
Implement Fire Management Plan	X	X	X	X
Protection of Cave/Lake Creek watershed		X	X	X
Protection of Monument's public water supply		X	X	X
Monument requests to be member of SNF Illinois Valley District ID Team, SW Oregon Province Advisory Council and Committees	X	X	X	X
Cultural Resources				
Protection of historic structures	X	X	X	X
Collection storage in quonset hut	X			
Collection storage moved to administrative site			X	X
Collection storage moved to Chateau		X		
Keep day-use vehicles out of historic district		X	X	X
Interpretation/Cave Tours				
Concession guided cave tours	X			
NPS guided cave tours		X	X	
Nonprofit organization guided tours				X
Special/Additional NPS guided tours		X	X	X

Actions	Alternative A	Alternative B	Alternative C	Alternative D
16 person tours with 6 minute intervals	X			
14 person tours with 15 minute intervals		X	X	X
Recreational Resources				
Increased recreational activities			X	X
Expansion of NPS trail system			X	X
Scenic Resources				
Protection of foreground viewshed		X	X	X
Protection of at least 50% of middleground viewshed for lands within direct NPS management		X	X	X
Visitor Services and Facilities				
Use of IVVC for visitor contact	X	X	X	X
Use of IVVC for cave ticket purchase		X	X	X
Interpretive programs at USFS Grayback Campground	X	X	X	X
Rehabilitation of cave trail	X	X	X	X
Environmental education/outreach programs at Monument	X	X	X	X
Adaptive reuse of Chalet as visitor center and orientation		X	X	
Development of new visitor center in main parking lot				X
Visitor services provided in Chateau	X		X	X
Chateau used for Monument administration offices (headquarters)		X		
Overnight lodging/food service provided by concessioner	X		X	X
Overnight lodging/food service suspended		X		

Actions	Alternative A	Alternative B	Alternative C	Alternative D
Expansion of NPS functions in IVVC		X	X	X
IVVC building enlarged			X	X
Concession gift sales in lower level of Chalet	X			X
Concession gift sales in lower level of Chateau			X	
Establishment of nonprofit institute				X
Reconfigure main parking lot		X	X	X
Establish a traffic light between main parking lot and Chateau			X	X
Fee Interpretation Program		X	X	X
Administrative Facilities and Systems				
Administrative functions moved to new building in administrative site			X	X
Guide Dormitory/upper level Chalet reused for administrative purposes		X		
Administrative functions moved to 2nd, 3rd, 4th floors of Chateau		X		
Guide Dormitory housing for employees	X		X	X
Upper level of Chalet for employee housing	X		X	X
Checking and Comfort Station staffed during peak season			X	
Bury all above ground utility lines		X	X	X
Employee shuttle system available		X	X	X
Formal trail maintenance agreement with USFS		X	X	X
Boundary				
Boundary Expansion			X	X
Protected area established		X		X

Northern Spotted Owl
(*Strix occidentalis*)

The Affected Environment

The Affected Environment

This chapter describes the natural, cultural, recreational and scenic resources of Oregon Caves National Monument. It discusses the socioeconomic conditions, interpretation, visitor use, concessions, and existing Monument development and programs. This chapter provides the base information from which resource and visitor use issues were identified and potential actions were developed for the Alternatives chapter, along with the associated impacts of these actions which are presented in the Environmental Consequences chapter.

The Natural Environment

Geologic Setting

Oregon Caves National Monument is located in the Siskiyou Mountains of the Klamath Geologic Province, a complex of mountains rather than distinct ridges, extending from the Pacific coast inland to the southern Cascade Mountains. Geographically, the mountains of the Klamath region are part of the coastal chain of mountains extending to the north and south, but differ from them in age and history, in geological character and complexity, and in height and east-west extent. Furthermore, their closest geological relations are not with the Coast Ranges, but with the Sierra Nevada and the Blue Mountain complex of Oregon.

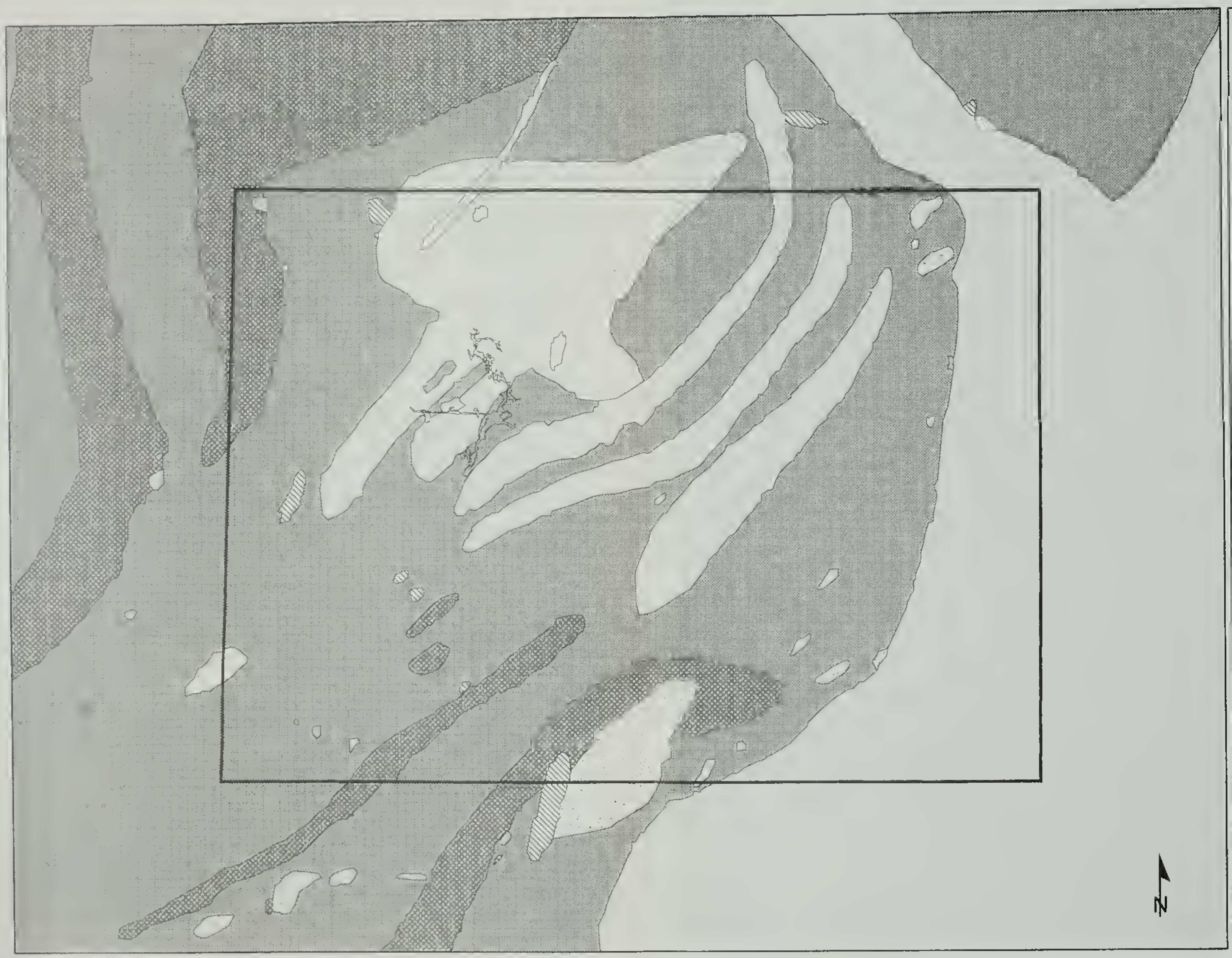
The Siskiyou Mountains are the northernmost group of mountains making up the central Klamath region. They extend in an east-west direction along and on each side of the California-Oregon border, between the Klamath River on the south and the Rogue River on the north. The oldest known rocks in Oregon are found in the Siskiyous. The complex geological history of the region portrays episodes of sedimentation, volcanism, igneous intrusions, metamorphism and accretion of deep oceanic crust onto the North American continent. This latter process is the result of tectonic collision of two plates where oceanic crest ends up on top of continental crust. It is also associated with folding, faulting, uplift and erosion. These events have exposed a contorted mosaic of diverse rock types. Among these are iron and magnesium-rich oceanic crustal rocks, such as peridotite and serpentinite, which are not commonly exposed on land. The chemistry of these ultramafic rocks, and the soils derived from them, ultimately influence botanic diversity, relationships, and vigor of associated plant communities.

The petrography of the Monument is composed of late Triassic to mid-Permian metamorphosed sedimentary (argillite, metachert, marble) and igneous rocks (metabasalts, metagabbros). Metamorphism was low grade regionally, as indicated by the occurrence of argillite, with higher grade metamorphism having occurred in rocks near quartz diorite plutons and dikes (evidenced by the mineralogical presence of garnets, biotite, sillimanite, and actinolite). The Monument presumably is entirely underlain by the Grayback Pluton, a quartz diorite intrusion of Jurassic age which comprises about one third of the Monument in surface exposures. About an acre of serpentinite is exposed along the border of the Grayback Pluton near the southern boundary of the Monument.

The geology of the Monument has been mapped by Monument staff and is shown in Figure 12, Geology.

ORCA GMP/EIS

FIGURE 12
Geology



Legend

▭ Park Boundary

╱╲╱ Cave

Geology

▩ Applegate argillite

░ Applegate marble

▨ Applegate metachert

▩ Applegate metavolcanic rock

▭ Grayback Pluton

░ Ultramafic rock

0 Kilometers 1
0 Miles 1

Data Sources:
USGS: park boundary
NPS, geology, cave

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Geology

flowstone, and calcite crystal formation and orientation. Temperature beyond the twilight zone (that part of the cave in which there is only dim light and little photosyntheses) ranges from 32 to 49 degrees Fahrenheit. Relative humidity ranges from 40 to 100%.

To restore the original airflow patterns, the NPS began restoring the original size of passages both in the cave and at entrances. Over 1,400 tons of rubble placed inside passages during early trail development were removed from interior passages. Two airlocks were installed in the cave tunnels in the summer of 1990; one below the Clay Pockets and the other just after the Connecting Tunnel. The natural Carbide Room entrance was reopened the same summer. The Icebox Cave entrance was reopened in the summer of 1996. At least two small blocked passages remain unopened near the main entrance.

Other cave restoration efforts since 1985 include control of algal growth, removal of lint and obsolete utilities and trails, installation of bat gates, and ongoing replacement of the trail and lighting system. Eight other known caves in the Monument are much smaller, have few formations, and much less direct human activity.

A detailed process of inventorying and mapping cave resources has been implemented during the last five years, with approximately 90% of known cave passages being completed. Cave formations include speleothems and speleogens. Speleothems form by deposition, usually of carbonate minerals, and include canopies, cave pearls, dripstone (columns, stalactites, stalagmites, draperies), flowstone, shelfstone, silticicles, coralloids, conulites, helictites, microgours, Mundmilch, and rimstone. Speleogens result from solution of the carbonate bedrock (marble) and include anastomoses, arches, bevels, cave "ghosts," boxwork, canyons, domes, domepits, meanders, meander niches, natural bridges, palettes, pendants, pillars, potholes, rills, scallops, and vugs. Surface karst and karren include rills, sinks, and what may be relict alpine karst.

Nearly all of the formations and bedrock of the cave are made of the mineral calcite. Exceptions are clay vermiculations, ice formations near cave entrances, gypsum crusts, possible aragonite crystals, and argillite and chert layers interbedded with the marble wallrock.

Most of the fragile formations, especially stalactites, are broken near the 2,400 foot-long paved trail. However, most of the cave away from the main tour route is in relatively pristine condition except for a few crystal pools that were mined early in the cave's human history, and where tubular stalactites come or came close to the floor of the cave. Recent solution of flowstone may be the result of fire suppression and/or human or naturally caused drought.

Sediment deposits found in the cave include hoodoos, talus, conglomerates, bones, breakdown, clay vermiculations, and imbricated cobbles. Clastic sediments originate from all of the rock units exposed on the surface above the cave. Varved-like silts, possibly volcanic ash, congelifracts, exfoliated flowstone, and solution/deposition flowstone cycles record Ice Age glacial, periglacial, and climate affects.

Cave features that are rare or not reported elsewhere include Mundmilch and flowstone-covered vermiculations, flexible, velvet, and subaqueous flowstone, mud stalactites, root-cored cave "ghosts", high crystal pool densities, chert patina, dikes, and sub-minimum stalactites. The shape and color of many features changes with depth and nearness to entrances, demonstrating an intricate continuum relationship of chemistry and physics between the underground and surface. The Monument may be the only NPS managed cave with exposures of the earth's three main rock types— igneous, sedimentary and metamorphic—and their primary subsets.

Geologic structures found in the cave include breccias, dikes, faults, slickensides, stylolites, joints, sills, and soft sediment deformation. Tilted bedding, faults, adjacent non-carbonate rocks, steep slopes, and climate changes throughout time have resulted in a diversity of cave room shapes. Of all NPS units, the Monument may best expose a relict back-arc basin and what were some of the world's deepest rocks. Most other tectonic plate edge effects can also be seen: sideways and head-on collisions, subduction, accretionary wedges, mid-ocean spreading centers, forearcs, and continental growth, in one of the Northwest's oldest areas.

Soils

The soils at Oregon Caves National Monument are determined largely by geology, elevation, and slope aspect. Rocky soils occur on the metacherts, metabasalts and metagabbros. Thin, sandy soils occur on the quartz diorite, while thin loamy soils occur on marble and on south aspects and lower elevations. Deeper soils of gravelly loam occur near upper and lower Cave Creek and on the argillite soils with north aspects, especially those at the higher elevations, and include windblown dust.

According to the Natural Resources Conservation Service (NRCS), there are no soil map units within the study area that are classified as prime or unique farmland.

Water Resources

Surface Water

Several first-order streams originate within and west of the Monument. These streams drain into Cave Creek and then into Sucker Creek. (Refer to Figure 3, Natural Features in Purpose and Need for the Plan chapter.) The Grayback/ Sucker watershed makes up 10% of the 628,000 acre Illinois River basin, which is part of the Rouge River basin. The Grayback/Sucker watershed has been designated in the *Northwest Forest Plan* (refer to Land Use Documents section in this chapter) as a key federal watershed, partially because of its salmonid populations.

Six small headwater springs exist in the Monument and flow most years. One spring becomes the head of upper Cave Creek. Upper Cave Creek eventually sinks into its bed, flows through Oregon Caves as the River Styx, and re-emerges from the cave's main entrance as Cave Creek. Two intermittent streams draining snowmelt from the Monument's largest upper meadow also sink into the cave rather than converge with upper Cave Creek. Another spring supports Waterwelt Creek, which flows into Panther Creek north of the Monument. A third spring occurs above (north of) the main parking lot. Flow from two other springs quickly enters Cave Creek and the sixth spring is the source for No Name Creek. About 10 other small mostly intermittent springs exist.

The National Wetlands Inventory maps delineate wetlands over one acre in size. Though none are depicted within the Monument, no official inventory of wetlands has been conducted. Most wetlands appear to occur around active springs and are less than one acre in size. Wetlands are important in preserving relict species.

Land Slides

Landslides have occurred at the Monument in the vicinity of the main parking lot and upper parking lot. According to NPS records, the parking area was probably built on a pre-existing slide. Marble formations, which contain cracks and crevices, allow water to penetrate. Water enters the fault zone, and then drains into the slide area to cause saturation, uplift pressures, and ultimate movement in the slide. This occurred in 1942 and 1954. The solution to the slide problem was to correct the drainage of water into the area, and perforated pipes were installed above the parking lot at a considerable expense. The parking lot was stabilized and then filled.

During the winter of 1996-1997, extreme wet weather caused land movement adjacent to the Monument headquarters building on previously filled land. A report was prepared by a geo-technical engineer to assess the extent of movement and address the issue of land stabilization. The concluding report suggested that the staff at the Monument vacate the Monument headquarters building. A temporary trailer for administrative offices at the Monument will be located in the main parking lot to replace the Monument headquarters building.

Flooding and Debris Flow

In 1964, heavy rains on snow caused a debris flow that flowed into the Chalet and the Chateau, resulting in significant damage. It cannot be determined whether this occurred in the 100-year floodplain because the flow was probably enhanced by logging effects and failure of a small natural dam. However, the release of sediment from soil-creep filled upper drainages probably follows a rough cycle of one to several centuries. After the 1964 flood, the culvert system was enlarged to handle 10 to 20 year flood events. Only once since then was the system overloaded. Protection of the historic buildings may be extended if the current storm drainage system is improved to accommodate greater than 100-year flood events. However, a culvert big enough to handle a 100-year flood would seriously diminish the integrity of the National Register historic district.

Weather and hydrologic conditions which might trigger floods or debris flows in the watershed (United States Geological Survey [USGS] 1983) are monitored daily. Certain combinations of rainfall, snowpack, snowfall conditions, air temperature, and storm drain flow rate determine if a flood hazard exists. When this situation is reached all non-essential personnel are instructed to prepare for immediate evacuation, and if necessary, the road at the ranger station would be closed.

Water Rights Protection

The Monument was reserved from the public domain in order to preserve and protect the caves. Federal reserved water rights, having priority dates coincident with dates of reservation, may provide some protection of surface and ground waters and hence protect aspects of the caves and other water-dependent resources within the Monument. However, determination as to whether reserved rights exist at the Monument will likely have to wait until Oregon conducts a basinwide adjudication for this part of the state. Adjudications are the usual forum for defining and quantifying reserved rights on federal lands. There is no known timetable for an adjudication in this part of Oregon.

Karst Hydrogeology

Fundamental to both the origin, as well as the future of Oregon Caves, is water. The same waters that created the more than 15,000 feet of known cave, with respect to provenance and transfer through the karst aquifer, are continuing to create the cave today. (See definition of karst in Appendix, Glossary.) That is, unlike other highly celebrated NPS caves of the west—Wind Cave, Jewel Cave, Carlsbad Caverns, and Lechiguilla Cave for example—Oregon Caves were the result of dissolution of the carbonate rock (marble) by *flowing* water coming directly from the surface.

Water presently enters the caves by two primary mechanisms. These mechanisms can be classified as either concentrated allogenic recharge or diffuse autogenic recharge. Concentrated allogenic recharge refers to water which originates from beyond the karst aquifer (the Applegate marble), and enters the subsurface at a discrete point or series of discrete points. "Text-book" concentrated allogenic recharge is seen in other karst settings by a surface stream flowing over non-carbonate strata and suddenly sinking into a swallet upon reaching the soluble strata of the karst aquifer. Immediately up-valley from the cave entrance is upper Cave Creek, shown by dye-tracing to recharge the base-level stream of Oregon Caves. If one traverses the channel of upper Cave Creek under low flow conditions, surface water is only observed for short segments, appearing at "springs" and is slowly lost into the colluvium of the stream bed.

The appearance and subsequent disappearance of such surface water is not necessarily a karst phenomenon within the Monument. If the other stream channels of the Monument are traversed where carbonate strata is absent, similar occurrences of surface water are observed. As these channels represent the extreme headwaters of surface watersheds, there is a very small catchment area, and thus producing a limited low or base flow component. Along the main stems of these high-relief streams there is enough recharge to produce modest perennial flow. However, the vast majority, if not all, of this flow sinks into the thick colluvium of the valley floors. This near surface ground-water, flowing though the colluvium which mantles the bedrock, is forced to the surface through these "springs" primarily by two mechanisms: 1) As a result of a change in hydraulic conductivity of the colluvium, or 2) As a result of the intersection of the underlying bedrock and the surface. All observations of surface flow in the headwaters of the Monument, in both karst and non-karst drainage, were the product of these two mechanisms. (See Figure 13, Concentrated Allogenic Recharge.)

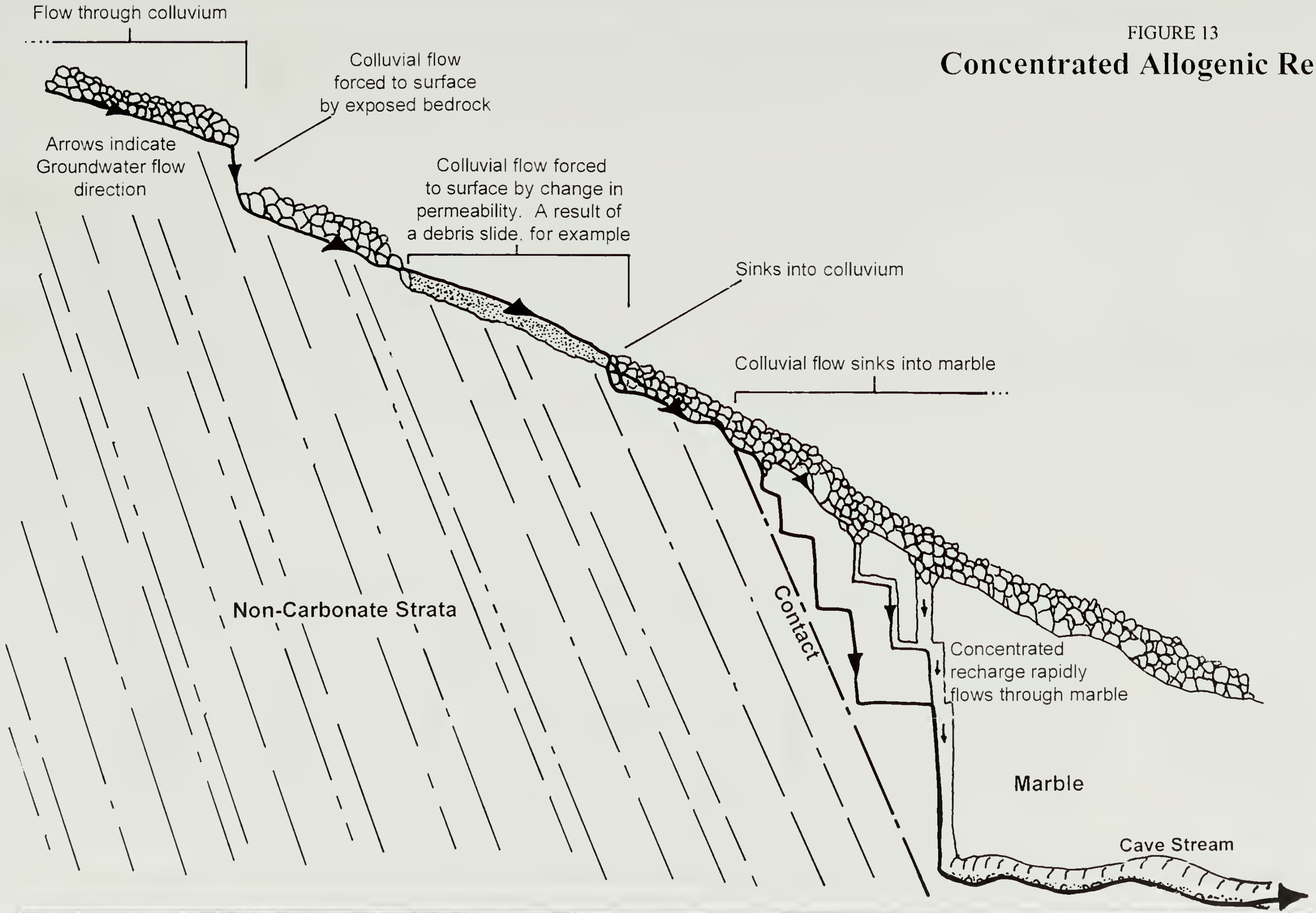
It should be noted that no surface flow of upper Cave Creek was observed across the marble area. It is reasonable to assume that once the marble is encountered, the near surface colluvial ground water of upper Cave Creek sinks into the karst aquifer at discrete points. It is this water that created, and continues to create, Oregon Caves.

Except for winter and spring snowmelt, upper Cave Creek is the primary recharge component of River Styx, the principle stream in Oregon Caves, as demonstrated by ground-water dye traces. This hypothesis is supported by dye tracing results. When fluorescent dye is injected into upper Cave Creek, it appears in River Styx within 50 hours. It is likely that the majority of this time was spent traversing the colluvial pathway prior to sinking into the marble, rather than flowing through the marble. The rapid flow velocities through the marble is also supported in the carbonate chemistry of River Styx and its spring at the entrance to Oregon Caves. These waters are consistently lower in total dissolved ions (calcium, magnesium, and bicarbonate) than that found elsewhere in the system, reflecting a short residence time within the karst aquifer. (See Figure 14, Oregon Caves Dye Traces.)

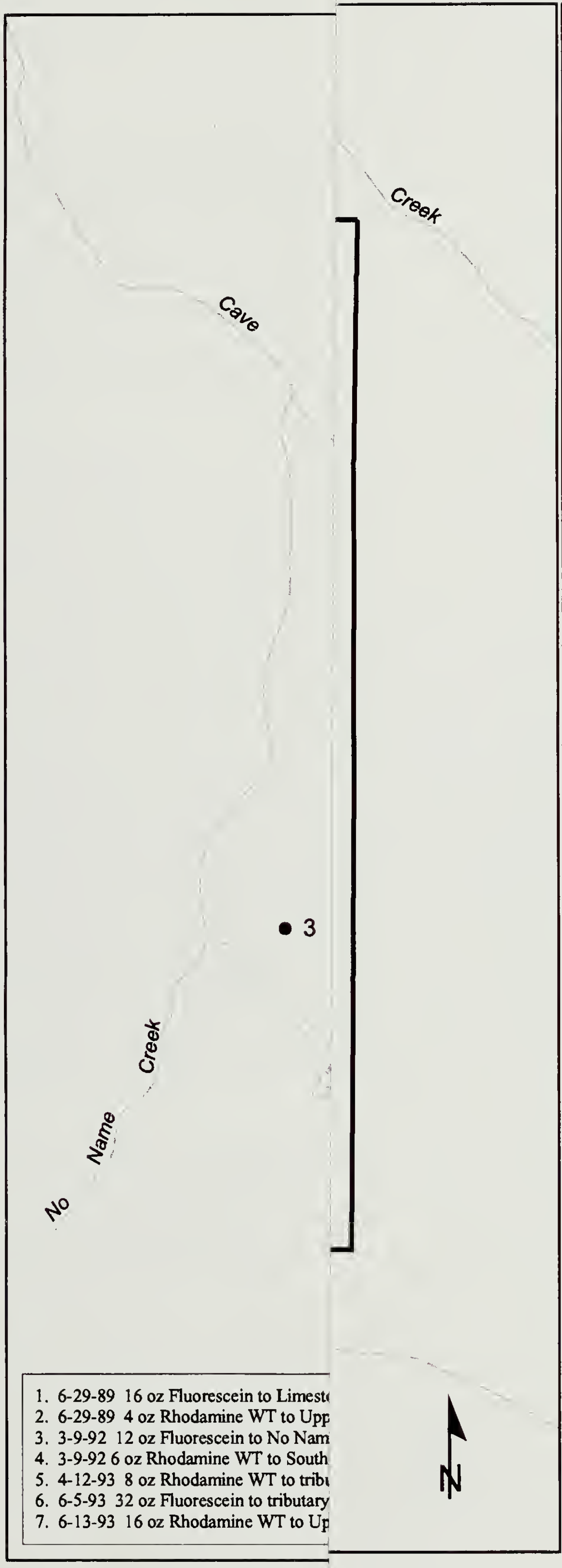
If concentrated allogenic waters can be thought of as the agent which created the passages of Oregon Caves, then the diffuse autogenic waters can be viewed as the instrument which decorated the caves. Diffuse autogenic waters, that which falls directly upon the karst aquifer and enters through fractures and bedding planes, are ubiquitous throughout the caves. The highly fractured Applegate marble provides autogenic waters a multitude of avenues to enter the cave. These waters, moving slowly through the marble, may enter the cave either undersaturated with respect to calcite, whereupon additional calcite is dissolved, or supersaturated, where calcite may be precipitated. The numerous calcite speleothems are the result of diffuse autogenic recharge.

FIGURE 13

Concentrated Allogenic Recharge


Flow through colluvium
Colluvial flow forced to surface by exposed bedrock
Arrows indicate Groundwater flow direction
Colluvial flow forced to surface by change in permeability. A result of a debris slide, for example
Sinks into colluvium
Colluvial flow sinks into marble
Non-Carbonate Strata
Contact
Concentrated recharge rapidly flows through marble
Marble
Cave Stream

ORCA GMP/EIS



1. 6-29-89 16 oz Fluorescein to Limest
2. 6-29-89 4 oz Rhodamine WT to Upp
3. 3-9-92 12 oz Fluorescein to No Nam
4. 3-9-92 6 oz Rhodamine WT to South
5. 4-12-93 8 oz Rhodamine WT to trib
6. 6-5-93 32 oz Fluorescein to tributary
7. 6-13-93 16 oz Rhodamine WT to Up

FIGURE 14
Oregon Cave Dye Traces

Legend

● Dye Entry Points
Dye Trace Results
Cave
Streams
Contours
▭ Park Boundary

Geology
▨ Applegate marble

0 Kilometers 0.2
0 Miles 0.2
50m contours

Data Sources:
SISKIYOU NF: streams
USGS: park boundary
NPS: contours, cave, dye traces, geology
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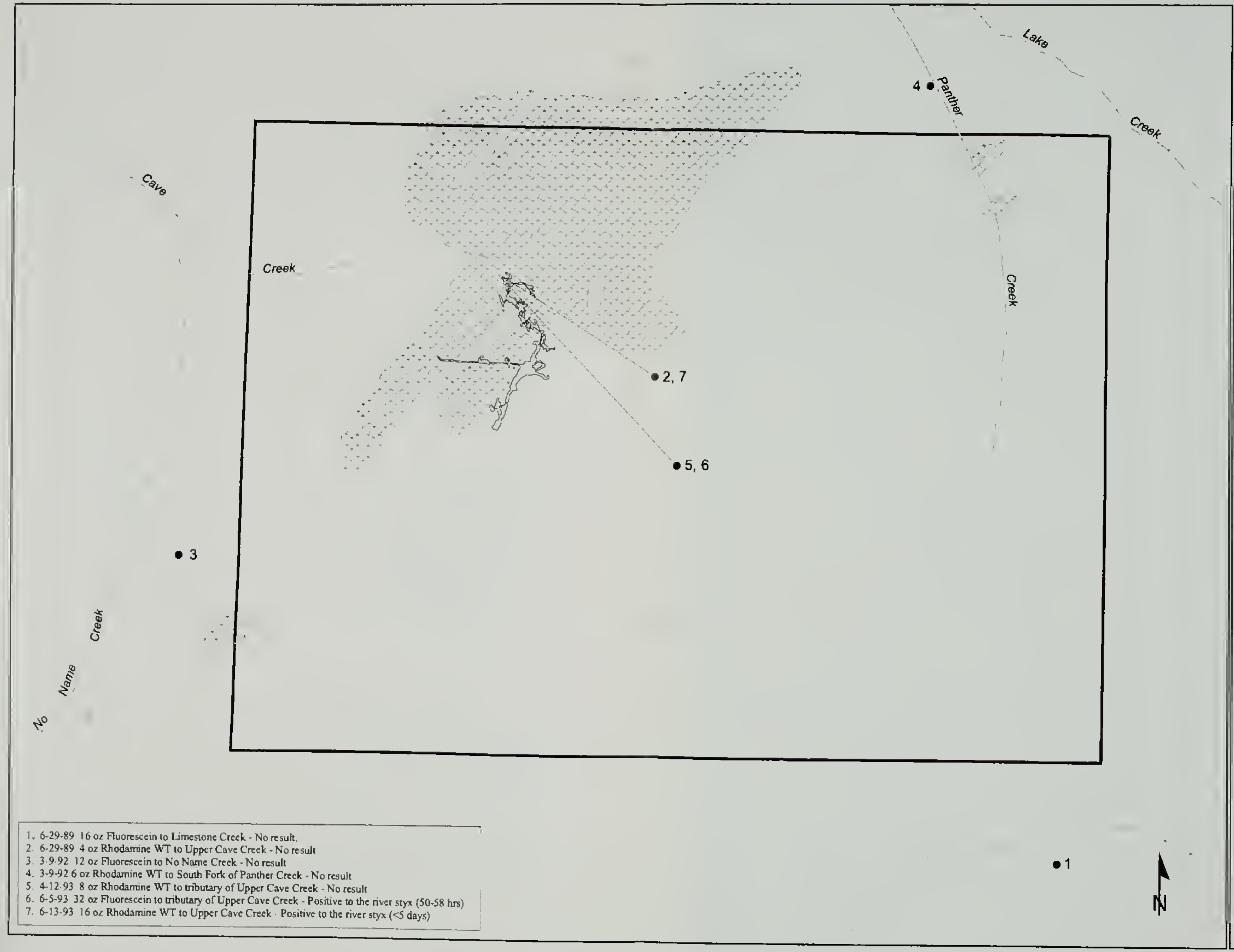
Dye Traces

ORCA GMP/EIS

FIGURE 14

Oregon Cave Dye Traces



1. 6-29-89 16 oz Fluorescein to Limestone Creek - No result.
2. 6-29-89 4 oz Rhodamine WT to Upper Cave Creek - No result
3. 3-9-92 12 oz Fluorescein to No Name Creek - No result
4. 3-9-92 6 oz Rhodamine WT to South Fork of Panther Creek - No result
5. 4-12-93 8 oz Rhodamine WT to tributary of Upper Cave Creek - No result
6. 6-5-93 32 oz Fluorescein to tributary of Upper Cave Creek - Positive to the river styx (50-58 hrs)
7. 6-13-93 16 oz Rhodamine WT to Upper Cave Creek - Positive to the river styx (<5 days)

Legend

Data Sources:
SISKIYOU NF: streams
USGS: park boundary
NPS: contours, cave, dye traces, geology
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Dye Traces

As found in other carbonate caves, many of the speleothems of Oregon Caves have undergone several episodes of precipitation and erosion by these diffuse groundwaters. Over the course of time it is fairly common for diffuse water to enter the same point in a cave in either supersaturated or undersaturated conditions with respect to calcite. Although these changes are part of a natural system, it is quite possible that human alteration of that natural system can, over time, cause unnatural chemical erosion or precipitation to speleothems. Such changes can occur when the quantity or carbonate chemistry of the groundwater is altered by regional or local land uses. For example, if the amount of precipitation is increased, groundwater residence time may be decreased in response to greater hydraulic head in the vadose (unsaturated) zone. In this case water which may have entered the cave in a chemically supersaturated state now enters the cave as chemically aggressive, undersaturated water, and thus dissolves the speleothems.

Karst Watershed Management

The natural processes outlined above have been in motion throughout the entire geologic history of Oregon Caves. Although there is no doubt that the hydrogeology of the caves have undergone changes, both gradual and catastrophic, there is also no doubt that the resultant system is the product of these natural changes. Every passage, every speleothem, even down to the very carbonate chemistry of the waters and the air flow though the system are the result of centuries of natural development. In a few short decades, perhaps in only a few moments, human activity caused drastic and far reaching affects to this system. These changes are evident in Oregon Caves. Tunnels were blasted open, trails were laid, lights installed, and thousands of people visit the cave each year. Recent management efforts, described above in the Cave Resources section, have started to mitigate these more obvious anthropogenic changes.

Similarly, it is recognized that a watershed management strategy is needed for the protection and conservation of Oregon Caves. This holistic approach begins with delineating the karst watershed followed by synoptic water quality/quantity sampling and flood pulse sampling, and then cave aquatic biological inventories. Karst watershed management must include not just the known cave system, but the entire carbonate unit in which the cave lies, and, at a minimum, the surface headwaters of the carbonate unit. Since the Monument is of limited size, a thorough reconnaissance has been made and the geology has been mapped at about 1:12,000 scale. Certainly, the potential for additional caves exists. Not only that which is connected to the presently known cave, a potential demonstrated by the continued exploration of Oregon Caves; but also the cave passages which may never be connected to the system by man, a potential shown by the fortuitous intersection of passages and the human-made exit tunnel. It is highly likely that the marble contains many additional thousands of feet of cave.

As the entire headwater region of the marble karst aquifer is underlain by non-carbonate strata, it is reasonable to assume that topographic divide also defines the karst watershed. Of primary concern to the hydrologic protection of the known portion of Oregon Caves is upper Cave Creek, which, as shown through dye-tracing, supplies the majority of the concentrated allogenic water to the cave. Located along Limestone Ridge on the southwestern boundary, is a portion of this drainage that lies outside the existing Monument.

Knowledge gained through basic karst research, such as the rather simple dye-trace performed on upper Cave Creek, is essential to the management of the karst. Additional dye-traces may be necessary to further explore the hydrogeology of the karst ground-water system. Oregon Caves staff have also conducted extensive water monitoring. Steps should be made to fully analyze the data in order to establish baseline conditions and to further understand groundwater transfer mechanisms through the marble. Water quality data analysis will also indicate future monitoring needs, such as storm-pulse monitoring, or monitoring for targeted contaminants or other ions.

The remaining marble is likely recharged by diffuse autogenic waters, as it underlies the flanks of ridges rather than valley floors where streams may sink. Although the bulk of this portion of the Applegate marble does not contain known cave, the potential for undiscovered cave, as described above, is high. Underlying the ridge north of the Monument boundary lies a relatively large portion of marble continuous with the marble within the Monument, where the potential for additional cave, perhaps connecting to the known cave, exists.

Many other karst areas throughout the world, including NPS karst lands, are plagued by development and associated pollutants. Oregon Caves has an advantage of extremely sparse development within its karst watershed. Even the two portions of the marble watershed, the south boundary headwaters of upper Cave Creek, and the marble north of the Monument boundary, have thus far been spared of much development and alteration. Today, the only development within the Monument has been located hydrologically down-gradient from the main cave. The vast majority of the Monument remains in old-growth forest. Karst aquifers throughout the world are typified by the high degree of integration of the surface and the subsurface. Any changes to the surface are immediately operative, and sometimes with drastic consequences, on the subsurface.

Successful management of a karst aquifer must also consider the cave aquatic ecosystem. Although such organisms, at least on the macroscopic scale, have not yet been documented in the waters of Oregon Caves (with the exception of a water mite), an extensive aquatic inventory of all base-level streams has not been completed. Karst aquifers are noted for extremely oligotrophic (oxygen-rich, but nutrient poor) streams. The low nutrient input to the streams of Oregon Caves, documented by microbiologists, is no exception. Diffuse autogenic (locally-derived) recharge, working its way down through narrow fractures, supplies little or no organic matter into the cave. The concentrated allogenic recharge supplied from upper Cave Creek runs through a gauntlet of filters flowing through thick colluvium prior to sinking into the marble. Additionally, limited human disturbance to the watershed also keeps nutrient input low, and is evident by the minor amount of sediment found in the cave streams. Although there has been an inventory of terrestrial cave life, little work has been done on cave aquatic inventories. As the streams in Oregon Caves naturally contain extremely low amounts of organic debris, it is reasonable that aquatic life may also be limited in diversity and density. However, if an aquatic community exists, these organisms may be extremely vulnerable to eutrophication brought about by even the most moderate changes in watershed land use. An attempt to rigorously inventory the aquatic life of Oregon Caves should be made.

Karst Watershed Land Use

According to the enabling legislation of Oregon Caves National Monument, a proclamation signed by President William Howard Taft in 1909, states that "...it appears that the public interests will be promoted by reserving these caves with as much land as may be necessary for the proper protection thereof..." This Proclamation also states that "...any use of the land which interferes with its preservation or protection as a National Monument is forbidden." During the time of the establishment of the Monument, little was known of karst hydrogeology. At that time caves were seen primarily as entities far removed from the surface environment. Today it is known that caves are closely linked with the surface. Land use changes can bring about drastic effects to the cave's hydrology and aquatic ecosystem. Basically, any changes in surface land use will cause changes to the subsurface environment. Most managers have little problem visualizing the subsurface impact by drastic changes to land use like development and clearcutting. However, small, cumulative impacts from land use changes such as fire suppression, can also alter the cave environment.

Further information is needed at Oregon Caves about how the role and history of natural fire relates to the cave system, especially in relationship between diffuse autogenic recharge quantity, carbonate chemistry and speleothem development.

With the development of any karst lands, land use changes are made which may alter the karst aquifer. Although the only surface development at Oregon Caves are at the extreme down-gradient end of the marble, there have been developments that may impact the karst aquifer. For example, in the lower reaches of upper Cave Creek above the Chalet, there is a series of underground pipes and culverts intercepting near-surface colluvial groundwater. This water is piped beneath the parking lot and is discharged into lower Cave Creek. Further information is needed to determine if this drainage system is impacting the cave.

Public Water Supplies

Currently, public water supplies for the Monument are obtained from surface water sources. The main Monument development, in the vicinity of the Chalet, is supplied by a diversion from Lake Creek approximately one and one-half miles to the northeast. Water for the administrative site is collected in a spring box 1700 feet up the hill to the north of the site.

The watersheds above these diversions are managed by the USFS. Land use includes logging and cattle grazing, which create concern for future water quality impacts to these water sources. These streams are also subject to periodic flooding and landslides which can destroy diversion structures, resulting in interruptions to the water supply for the Monument. Storms during December 1996 and January 1997 washed out the diversion on Lake Creek which supplies the main Monument development. Damage to the road leading to the Monument impeded access of replacement materials to restore the water supply system. The diversion was reconstructed during the summer of 1997.

Groundwater sources have been considered in the past. However, hydrogeologic conditions are not favorable for obtaining groundwater supplies in the area. In 1967, the USGS conducted a reconnaissance investigation and concluded that significant quantities of groundwater were not likely to be found in the Monument or surrounding area. In 1977, attempts were made to drill horizontal wells in several areas where seeps indicated a higher probability of intersecting fractured bedrock. Five horizontal wells were drilled all of which yielded less than five gallons per minute.

Geologic formations in the area are comprised of granitic and metamorphic rocks which do not generally yield significant (greater than one gallon per minute) water. Groundwater in rocks of this type is generally confined to fractures, as the rocks have extremely low porosity and permeability (there are no pore spaces for water to flow through). Test drilling in the most likely prospect areas did not yield significant quantities of water. Future drilling is not recommended due to the low probability of obtaining more than even one gallon per minute from a well. Prospective drilling sites are limited due to the extremely steep and rugged terrain.

According to the Oregon Department of Water Resources records, there are no claimed water rights filed for groundwater sources in the township where Oregon Caves National Monument is located. This covers an area up to three miles in all directions from the Monument.

Alternative locations for diversion structures could reduce the length of pipelines. Also, alternative types of diversion structures could reduce the potential for future flood damage. Diversion structures could be constructed to more closely resemble sumps in the stream bed. These sumps would be designed similar to a large diameter well. Construction would be by excavating a pit with a backhoe and placing a section of culvert with torch-cut slots in a vertical orientation. The excavation would be backfilled with gravel to allow free flow of water from the alluvium to the sump. A tight fitting lid would complete construction.

Water Use and Treatment

The Monument receives public water from a water intake located within the upper portion of Lake Creek on USFS land northeast of the monument boundary. Land use within this watershed includes logging activities and a moderate amount of cattle grazing. Although not pristine, current disturbance levels within the Lake Creek watershed does not apparently preclude the use of its water as a treated drinking water supply. That is, with the current level of treatment, suspended sediment and bacteria levels are kept within drinking water standards. However, the Monument staff is concerned with cryptosporidium contamination and the future viability of this water supply as there are limited choices within the Monument boundary. Turbidity levels in the untreated water supply are frequently high. The NPS does not directly control the quality of this water supply.

Cryptosporidium

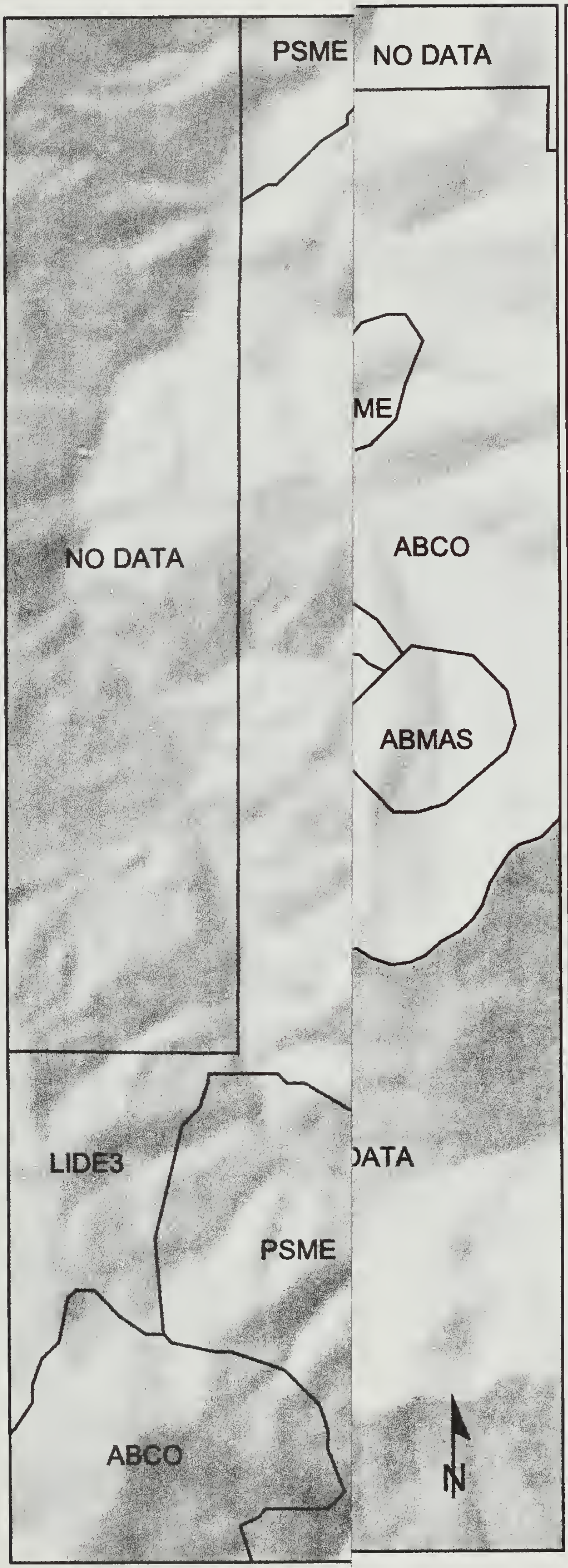
Cryptosporidium is a protozoan parasite that can live in the intestines of humans and animals, and is shed in feces. (Studies have shown that past outbreaks have been transmitted primarily by young calves. Fifty percent of young calves shed cryptosporidium oocysts.) The infection can be transmitted through person-to-person or animal-to-animal contact, ingestion of fecally contaminated water or food, or contact with fecally contaminated environmental surfaces. In the environment, the organism is protected by an outer shell called an oocyst. Once ingested, the organism emerges from the shell and infects the lining of the intestine. Ingesting the organism causes an illness called cryptosporidiosis that results in symptoms such as diarrhea, nausea, vomiting, fever, headache, and loss of appetite. There is no drug or treatment for this disease. People with healthy immune systems will recover on their own. People with HIV or AIDS, cancer and organ-transplant patients taking immunosuppressive drugs, and people with genetically weakened immune systems are especially vulnerable. To these people, cryptosporidiosis is a life threatening disease.

An outbreak of cryptosporidiosis occurred in Milwaukee in 1993 causing illness in 400,000 people and death to approximately 100. This outbreak was traced to water from the municipal water plant that comes from Lake Michigan. An outbreak has also occurred in Medford that uses water from Big Butte Springs. Cattle are allowed in that watershed. Outbreaks have also occurred in Clark County Nevada, in Georgia, in Washington, and in Minnesota.

The public health community, the drinking water industry, and drinking water officials recommend a multiple barrier approach to keep oocysts out of tap water. This includes source water protection, optimized treatment, and a sound distribution system. Good water quality is imperative to the persistence of natural aquatic communities and to the consumptive and recreational use of water by visitors. Ensuring the integrity of water quality is fundamental to the mission of the NPS. It is the responsibility of Oregon Caves National Monument to guarantee the safety of the public water supply, which will require protecting the watershed.

Vegetation

The Monument's forest ecosystem is significant both regionally and nationally. The Monument lies within a forest region perhaps more diverse and complex than any other in the West. The Monument's forest types are not well represented elsewhere in preserve status. (See Figure 15, Vegetative Associations.)



ORCA GMP/EIS

FIGURE 15

Vegetative Associations

Legend

ABCO
Abies concolor (white fir)

ABMAS
Abies magnifica shastensis
(Shasta red fir)

CHLA
Chamaecyparis lawsoniana
(Port Orford cedar)

LIDE3
Lithocarpus densiflora
(tanoak)

PIJE
Pinus jeffreyi (Jeffrey pine)

PSME
Pseudotsuga menziesii
(Douglas-fir)

0 Kilometers 1
0 Miles 1

Data Sources:
Siskiyou NF: Vegetative associations
USGS: topography, park boundary

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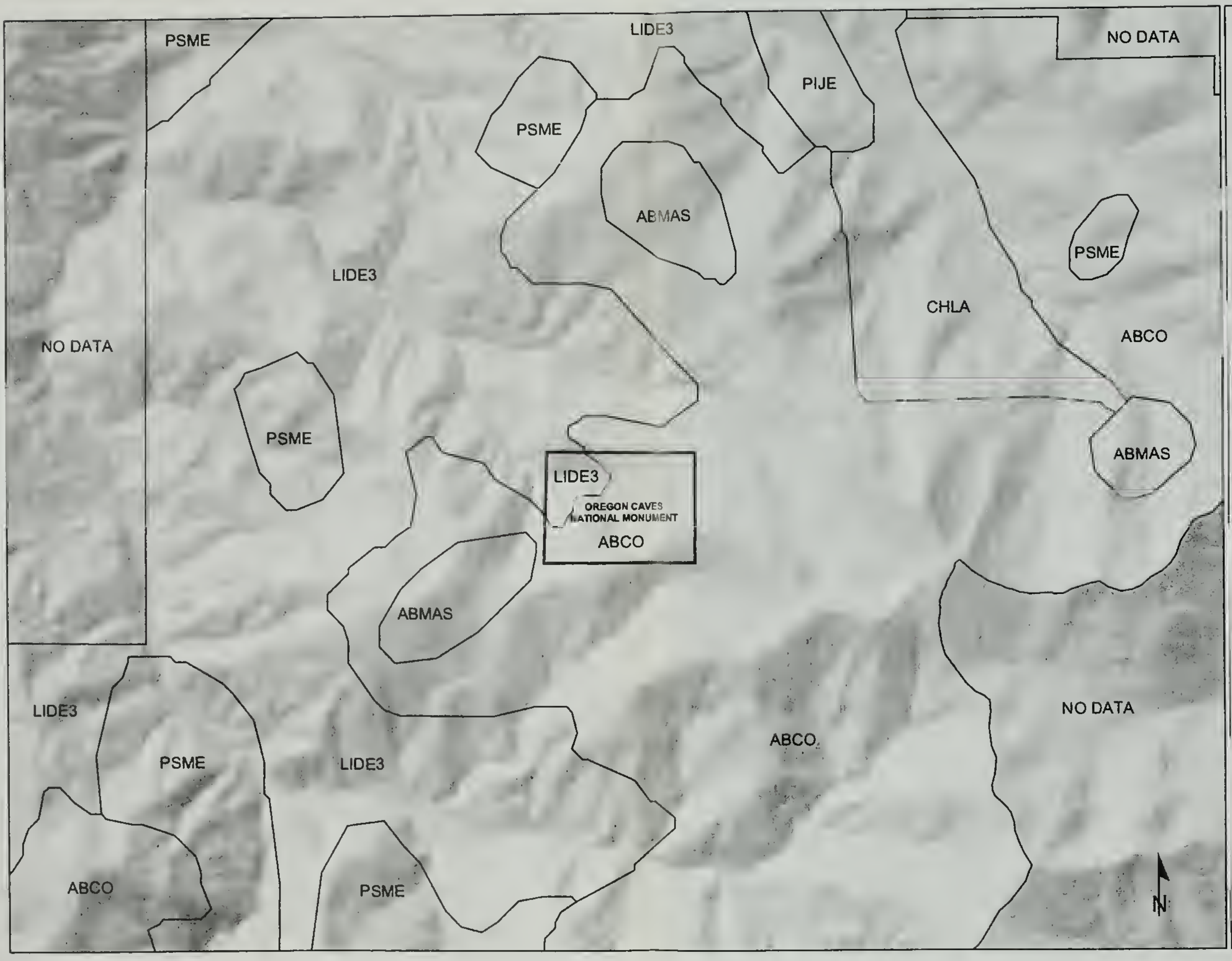
Vegetation



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Data Sources.
Siskiyou NF, Vegetative associations
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Vegetation

There are over 400 species of flowering plants known in the Monument, a high number for the Monument's small size. For example, Crater Lake National Park is over a hundred times larger than the Monument yet does not have even twice as many species. The percentage of disjunct (isolated populations), regionally endemic, and range-limited species is also high and is related to the Siskiyou's east-west orientation and geographical linkages, great age, moderate elevation, precipitation, productivity, and disturbance regimes. Varied topography, geology, and microclimate contributed to this diversity. The Monument's largest meadow supports perhaps the largest disjunct concentration of old-growth American sawwort (*Saussarea americana*).

Vascular plants that are rare in the Monument occur on small pockets of level serpentinite and quartz diorite, cliff-forming metagabbro, and talus-rich metachert. Exotic species occur in disturbed areas along roadsides and have recently been introduced into the upper meadows by way of horse droppings. The Monument has some of the thickest, heaviest, and most diversified mantle of mosses, lichens, and liverworts of any temperate forest.

Plant communities are mostly determined by variation in soil moisture and, to a lesser extent, by temperature. These in turn are affected by elevation, slope aspect, rock type, fire, snowpack, and leaf litter, in about that order of importance.

There is a predominance of tanoak on the lower elevation, south facing slopes and progressively more mesic Douglas fir forests at higher elevations. Of the seven plant community types identified in the Monument, four are widespread (Agee, 1991). The Douglas fir/oak type represents the upper bounds of the Mixed Evergreen Zone in southwest Oregon, and mostly surrounds the developed zone of the cave. The white fir/herb type is the highest elevation community type at the Monument and is transitional to the Red Fir Zone. It contains the oldest trees at the Monument, including the Big Tree, the largest diameter Douglas fir known in Oregon.

The Monument has at least one state listed species, *Ribes marshallii* (Marshall's gooseberry) as well as several taxon (*Eriogonum declinum*, *Lilium parvum*) listed as sensitive by the USFS (1988).

Port Orford Cedar Root Rot

Port Orford Cedar Root Rot is a disease only of the Port Orford cedar. It is caused by a pathogen named *Phytophthora lateralis*. The fungus infects the fine root system and moves up the tree eventually killing it. It has a limited distribution around the Oregon-California border where the tree's native range is located. It is spread by water, especially in the wet seasons, within drainage basins, and by animals, and vehicles (Root Diseases, Forest Pathology, SUNY College of Environmental Science and Forestry, 1997). The wood of the Port Orford cedar is valuable and the disease has had an economic impact in the areas where it has been traditionally harvested. Port Orford cedar root rot has infected the SNF.

Management practices by the SNF consists of minimizing disturbance and redistribution of soil, and restricting entry into areas with Port Orford cedar where this is possible. Vehicles need to be cleaned before entering exclusion zones and infected trees are killed. Port Orford cedar root rot has not yet been detected within the Monument but is found in adjacent areas, including Bigelow Lakes.

Port Orford cedar is the siding used on the historic buildings within the National Register historic district. An appropriate alternative is being sought to replace this siding due to the expense of the wood and the potential difficulty in finding future supplies.

Logging

Logging of the old-growth Douglas fir has occurred on about five acres surrounding the Monument's historic district and at least half of the surrounding sections of USFS land. Older forest habitat in the Grayback/Sucker watershed covered 53% in 1948; late and mid-successional forests in the same area now cover 34%. Since the Monument is the second smallest natural NPS unit, the most obvious impacts are edge effects, such as increased windthrow, increased shrub density, and changes in relative humidity and temperature. Effects on microclimate and herbaceous species like trilliums may extend up to 500 feet into the Monument from adjacent clearcuts, especially in areas down from the prevailing winds. If thinning and clearcutting continue around the Monument, 33% of the habitat of some populations in the Monument could be affected.

Planting of trees and seeds in surrounding clearcut areas on SNF could include seed or nursery stock collected in areas outside of the Klamath ecosystem. Cross pollination of this stock with old-growth stands inside of the Monument boundaries could impact the genetic integrity of future forests in the watersheds surrounding Oregon Caves.

Fire

The last major stand replacement fire occurred about 1650, with partial replacement fires in 1775 and 1802. Fire cycles run about 30 years in the lower elevations of the Monument and about 70 years in the upper. All fires have been suppressed on and off the Monument since the turn of the century. Northwest old-growth has the most biomass of any forest in the world. Fire suppression in the Monument has increased this by about a thousand trees. Over 200 tons of down material now occur per acre. Shrubs have increased and herbs have declined. In the absence of fire, the Douglas fir/oak community probably evolves into a dry white fir community with an increase of tanoak in the moister sites. Several herbaceous species have reappeared in the Monument with brush clearing in preparation for a 18 acre prescribed fire.

Mushroom Harvesting

Mushroom harvesting is an allowed use within SNF. Areas open to mushroom harvesting in various national forests in the northwest have experienced significant disturbances to fungi beds and the forest floor. The consequences of these disturbances are unknown at this time.

There is currently a restriction of harvesting all species of fungi within the Monument for personal or commercial use. The NPS regulations (36CFR2.1[c][1]) allow the superintendent to designate certain natural products that may be gathered for personal use or consumption "...upon written determination that the gathering or consumption will not adversely affect park wildlife, the reproductive potential of a plant species or otherwise adversely affect park resources." There has been no research to date to allow the superintendent to establish harvest levels for fungi that would support issuance of such a written determination.

Wildlife

As a result of a year-round food supply, a mild climate and forest complexity and diversity, Siskiyou/Klamath forests may contain the most vertebrates of any northern U.S. forest region.

Cows and horses occasionally come into the Monument and may threaten disjuncts in the upper meadows by trampling, grazing, and the introduction of exotic species. Rainbow trout, muskrat, and opossums are the only other non-native animals reported from the Monument. All are represented in small numbers and do not appear to be expanding their numbers or range.

Old-growth dependents include northern flying squirrels *(Glaucomys sabrinus)*, red voles (*Phenacomys longicaudus*), warbling vireos (*Vireo gilvus*), Vaux's swift *(Chaetura vauxi)*, ensatina (*Ensatina eschscholtzi*) and clouded salamanders (
Aneides ferreus). The western gray squirrel (*Sciurus griseus*) is state-listed as undetermined status and occurs in the Monument.

Within the last decade the overall bat population in the cave has undergone a substantial reduction even though the bat use inside the first two main cave entrances has increased during winter. Since large tours and perhaps lights appear to cause bats to move from their preferred roosting sites at Oregon Caves, closure of the tour route to such effects is likely to offset the overall bat decline.

Evaluating whether human effects on invertebrates in the cave are significant is best done by studying populations in both space and time. This can only be done by closing a part of the tour route for substantial periods of time, even if such a closure does not restore populations to a pre-historic distribution.

Mammals

Use of the cave and developed area by small mammals is common. The most commonly seen mammals are chipmunks, ground squirrels, chickarees, and deer. The cave has eight bat species, the most abundant being the long-eared myotis bat (*Myotis evotis*). It and most of the other species are most active in the cave in the middle of the night during early fall and therefore are not usually disturbed by visitors. Large tours have disturbed Townsend's big-eared bats during winter. Declines of fringed, long-eared, and long-legged myotis and the pallid bat may be from loss of old-growth and riparian areas outside the Monument.

The Pacific pallid bat (*Antrozous pallidus pacificus*), and the ringtail (*Bassariscus astutus*) occur in the Monument and are state-listed as limited in abundance in Oregon or throughout their range. The American marten (*Martes americana*), and the Townsend's big-eared bat (*Plecotus townsendii*) are state listed as critical and are found here. The fringed myotis bat (*Myotis thysanodes)* occurs in the Monument and is state-listed as vulnerable. The Monument is near the southern limit of the mountain beaver (*Apleodontia rufa*); this animal is common in the Monument's meadows.

Grizzlies and elk are no longer found in the area. Large mammals like mountain lions, bears, coyotes, and possibly fishers pass through the Monument.

The Monument may be of national significance in terms of its mammalian fossils. Based on a radiocarbon date, what appears to be a grizzly (*Ursa horibilis*) bone is over 50,000 years old, far older than the oldest of other Western Hemisphere records (10,000 to 15,000 years old). A jaguar (*Panthera onca*) skeleton may be the most complete ever found and may date from 20,000 to 40,000 years old. Scratches, possibly from black bears, have been found on sediment that appear to be very old as well. Other rare fossils include the mountain beaver and blue grouse.

Birds

The most commonly seen birds are Stellar's jays (*Cyanocitta stelleri*)and ravens (*Corvus corax*). Their unnatural concentrations in and near the developed area may have caused migration of the northern spotted owl (*Strix occidentalis*), the only bird on the Monument federally listed as threatened. One owl pair has occupied a small area of the Monument for the past seven years. Other commonly seen birds include dark-eyed juncos (*Junco hyemalis*) and pileated woodpeckers (*Dryocopus pileatus*). No species are federally endangered or candidates for listing. The northern goshawk (*Accipiter gentilis*) is state-listed as critical. Regional studies indicate that South American migrants such as most warblers, the northern grosbeak, and Swainson's hawk have likely declined in numbers on the Monument.

Reptiles and Amphibians

The Pacific giant salamander (*Dicamptodon ensatus*) is the most commonly seen salamander, the garter snake (*Thamnophis sirtalis*) is the most commonly seen reptile, and the Pacific tree frog (*Hyla regilla*) is the most commonly seen frog.. The state lists three salamanders (*Aneides flavipunctatus*, *Batrochoseps attenuatus* and *Plethodon stormi*) and the California mountain king snake (*Lampropeltis zonata*) as limited in abundance in Oregon or throughout their range. There is no record of the salamanders and only one record of the king snake in the Monument. The tailed frog (*Ascaphus truei*) and western toad (*Bufo boreas*) occur in the Monument and the tailed frog is state-listed as vulnerable. State-listed as undetermined status are the clouded salamander (*Aneides ferreus*) and the western gray squirrel (*Sciurus griseus*), both of which occur in the Monument.

Invertebrates

Recent species lists indicate there are about a dozen endemic macroinvertebrates in the main cave. These include flies, beetles, millipedes, grylloblatids, springtails, and water mites. The cave's age, moderate size and nearness to organic soils results in a relatively high biodiversity. Well-developed zonation of formations and lifeforms occur near entrances and with depth.

Fast growing/recycling populations of cave pool bacteria appear healthy although slow-growing cave wall actinomycetes (cave slime) and cave-adapted arthropods appear to be impacted by human-introduced organics near the developed cave trail. Stream macroinvertebrate density may have been affected by human caused changes in water quality in parts of the stream.

Surface species number at least one hundred; over 40 families are represented. Soil fauna presumably is diverse but is unstudied. The marble supports one of the densest snail populations of anywhere in the region.

Fossil invertebrates in the Monument's Applegate Group include crinoids and, presumably, conodonts, foraminifera, radiolarians, and ammonites.

Air Quality

The Monument is located in the Southwest Oregon Intrastate Air Quality Control Region, which is classified as an attainment area (meeting the National Ambient Air Quality Standards - NAAQS) for most major pollutants, including ozone, nitrogen dioxide, sulfur dioxide, and lead. Portions of Josephine County in and around Grants Pass, 30 miles north of the Monument, are classified as non-attainment (not meeting the NAAQS) for carbon monoxide, specifically the Grants Pass Central Business District, and fine particulate matter, (PM-10)specifically the Grants Pass Urban Growth Boundary. The air quality is exceeded in the winter from two primary sources, wood stoves and the wood products industry. The air quality in the vicinity of the Monument is classified as attainment for all major pollutants year round. The nearest air quality monitoring station to the Monument is located in Grants Pass. (Personal communication from Steve Aalbers, Air Quality Division, Oregon Department of Environmental Quality, August 13, 1997.)

The air quality at the Monument has been designated class II[1]. Air quality is moderately affected by local slash burning in spring and at times by regional fires in summer. No other major diffuse or point sources of particulates occur upwind. Increasing residential development in the adjacent Illinois Valley may increase presently minor effects from winter wood burning. Enough airflow exists through the cave so that radon concentrations are low. (Radon is a gaseous radioactive decay product of radioactive elements inherent in the mineralogy of the marble.)

Fire

Present Day Fire Environment

The current objectives of the fire management program for Oregon Caves National Monument is to allow fire to play its ecological role in the Monument while protecting human life, facilities, and cultural resources. Fire management is the responsibility of the superintendent, with technical duties and accompanying responsibilities delegated to staff members with major direction provided from the fire management officer from Crater Lake National Park. Interagency coordination has been important for the park due to the remoteness and small staff. An interagency agreement between the SNF and the Monument was first signed in 1982 and is annually reviewed and updated. This agreement provides crucial fire suppression resources as well as assistance in implementing prescribed burns.

Fire History

In order to clarify fire management objectives for the Monument one must first define the fire history to analyze fuel conditions for risk assessment in both the undeveloped natural areas as well as around the developed area. The natural fire rotation over the last 500 years for the Monument has been about 76 years. According to research done by Jim Agee (Agee 1990), the 19th century had the most fires, with an average fire rotation of 34 years. These fire rotations occurred within the following seven plant communities that have been previously identified:

To a large extent:
- Douglas fir/oak type
- Dry white fir/Douglas fir type
- Mesic white fir/Douglas fir type
- White fir/herb type

To a lesser extent:
- Meadow type
- Oak woodland type
- Alder type

The white fir/herb type is the highest elevation community type and is transitional to the Red Fir Zone. This type contains the oldest trees where fire has been a major influence on forest community species composition, structure, and function also affecting both the vertical and horizontal fuels complex. It is important to note that the last fire occurrence in the Monument was in 1921 in which a large portion was underburned with a low intensity, stand maintenance fire. It is also noteworthy that since 1921, no major fires have started within or entered the Monument. This has been the longest fire-free period in more than 300 years. This period of fire exclusion has contributed to the significant fuel loading on the Monument today.

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[1] The 1977 Clean Air Act amendments designated all national parks over 6,000 acres and all wilderness areas over 5,000 acres as class I. This classification affords the most protection from new major emitting sources. All other areas that meet the National Ambient Air Quality Standards were designated class II.

Values at Risk
The area below the Chateau was identified as a high fire hazard in the late 1970's, posing a substantial risk to control if a wildfire entered the Monument from the west. A fuelbreak was constructed west of the Monument on the SNF. This treatment was augmented in 1982 by one of the first fuels reduction projects completed in the canyon bottom area from the Chateau to the western boundary. Small dead fuels were removed, shrubs and understory trees were heavily thinned, and all the residual trees were pruned. However, the presence of many snags, which were not included in the 1982 treatment, and regrowth of brush since the treatment, continually presents a threat of a catastrophic fire with the potential of significant resource damage as well as loss of structures. Today, the current fire management program has been very active in continuing fuels treatment and implementing management ignited prescribed fire in predetermined high hazard areas. Funding for fuels treatment activities are often unstable due to the annual re-submission of needs through a fire program (FIREPRO) budgeting process.

Fire Suppression
The present day fire suppression policy for the Monument is to take full suppression action on any fire that occurs there. This policy is based on NPS guidelines from *the Wildland Fire Management Guidelines* (NPS-18, revised June 1990) and defined in the *Fire Management Plan* (March 1995) which is presently being reviewed. Fire suppression would require emergency consultation (if in a proposed critical habitat) for spotted owls or other T&E species identified in the *Resource Management Plan*. Retardant would only be used for protection of life, protection of facilities and cultural resources.

Presently the fire management program for the Monument has deficiencies in providing protection of structures, inadequate sustainable funding for manipulation of fuels, and the need for additional FTE support at the Monument.

The Cultural Environment

Cultural Context

Elijah Davidson of nearby Williams, Oregon, discovered a cave while hunting along Cave Creek in 1874. He returned on several occasions over the next few years to explore what later became known as the Oregon Caves. The newly discovered caves did not result in bringing droves of people into the region to see the unusual attraction, and although some mining activity did occur, the rugged topography hampered settlement and the development of transportation networks.

The site's potential as a resort or destination was recognized as early as 1885, but again, its remote location foiled several attempts to make it a private tourist attraction. Furthermore, none of the entrepreneurs could acquire title to the land because the area was still unsurveyed.

In 1908, a government survey was completed to protect the lands surrounding the cave from mineral entry. Using his authority under the Antiquities Act of 1906 [34 Stat. 225], President William Howard Taft issued Proclamation 876 on July 12, 1909, establishing Oregon Caves National Monument out of surveyed SNF lands. The potential of Oregon Caves as a tourist attraction was the driving force behind this designation, but they were considered a "natural monument" set aside to preserve a "scientific object." The USFS managed the Monument until its transfer to the NPS by Executive Order 6166 on June 10, 1933.

Oregon Caves Chateau

The USFS placed a ranger at the cave in 1910 to serve as cave guide, trail builder, and camp host. With the completion of the Oregon Caves Highway in 1922 providing direct access to the cave, the doors were opened for development to occur. In early 1923, a group of local businessmen applied for a permit to build a resort at Oregon Caves. The newly formed company hired a landscape architect for advice on how to lay out their operation, and recommended a visitor services building that included a lunchroom, office, lodging and employee dormitory. This was designed to be a Chalet of an "alpine type." After the Chalet was built, it quickly became the hub for circulation at the Monument. Other buildings followed, all designed in a rustic style using Port Orford cedar bark as sheathing. Rock walls, native plantings, rustic benches and a fireplace were also added to the site.

Oregon Caves Chateau Lounge

After the opening of the Redwood Highway connecting Grants Pass, Oregon with Crescent City, California in 1926, sleeping cottages, a guide dormitory, and later, in 1931, a hotel, were built at Oregon Caves to take advantage of the growing number of visitors to the area. The six-story hotel, known as the Chateau, opened in 1934, one year after the NPS took over administration and management of the Monument (per Executive Order in 1933).

The NPS continued to work closely with the concessioner over the next eight seasons. Master plans were developed for the Monument throughout the 1930s by NPS landscape architects, and CCC crews implemented aspects of those plans. By the summer of 1942, the Monument had the appearance of a rustic alpine village. Visitors to the area could enjoy tours of the cave, hike trails in and around the Monument, and spend the night at the

Chateau.

Additions and alterations to structures and landscape features have generally been minimal over the years and are in sympathy with the historic design intent. The Chateau was declared a NHL in 1987 because of its significance as an example of the rustic style of architecture. A National Register nomination was prepared for a designed landscape historic district comprising the developed area and entrance to the cave, and for its significance as an example of the public efforts to develop, manage, and protect the Monument's natural and recreational resources. This designed landscape possesses architecturally significant features which exemplify the tenets of the rustic style of architecture as practiced before World War II in many national park and forest areas. The property was officially listed in the National Register of Historic Places on February 25, 1992.

Checking and Comfort Station

Archeological Resources

Presently, no archeological sites have been documented within the boundaries of Oregon Caves National Monument. This information is based on a brief archeological reconnaissance conducted by Wilbur A. Davis in the summer of 1963, under the sponsorship of the Museum of Natural History at the University of Oregon. Davis conducted the investigation concurrently with a reconnaissance of Crater Lake National Park. Such an "archeological reconnaissance" does not constitute the same vigorous inspection and coverage of ground as does a full scale archeological survey. The brief investigations conducted at Crater Lake National Park and at the Monument still need to be followed up with more intensive archeological surveys and or subsurface testing to determine whether or not archeological resources exist within the Monument. The Monument survey had been scheduled for the summer of 1964, but since no archeological sites were found at Crater Lake National Park, the NPS gave the Museum permission to proceed to the Monument to conduct the reconnaissance in late summer of 1963. As at Crater Lake National Park, no sites were found at the Monument.

In a January 20, 1964, letter transmitting Davis's final report to the Regional Director of the NPS in San Francisco, J. A. Shotwell, the Director of the Museum of Natural History explained the negative findings as followed: "1) Oregon Caves National Monument lies in an area which was distant from major aboriginal population centers and hence was probably rarely visited;..." Shotwell also stated that "Crater Lake is a suboptimum habitat....with low soil fertility." These pronouncements, coupled with the statements of a 1952 Klamath informant quoted in Davis's report that "Crater Lake was a dangerous place best to be avoided", have instituted a common public perception that the areas of Crater Lake National Park and Oregon Caves

National Monument were devoid of prehistoric activity and settlement. Subsequent surveys of Crater Lake National Park in the 1980s and early 1990s, by NPS and contract archeologists, have refuted earlier perceptions and interpretations regarding Crater Lake National Park. Several sites have been found in the park, and two in particular, point to extended seasonal use of park lands. It is likely that a similar finding may be expected of future archeology work at the Monument.

The Oregon State Archeologist in Salem collects the findings of surveys conducted of all USFS timber sales in Oregon. These include reports describing survey of sales in the SNF, surrounding Oregon Caves National Monument. Many of these surveys have found archeological sites on lands adjacent to the Monument. It is anticipated that the scheduled archeological surveys during the summers of 1997 and 1998 at Oregon Caves National Monument will produce similar results.

Tribal Interests

Oregon Caves was within the aboriginal territory of the Takelman people in the 19th century. The Takelma (a language group related to Kalapuyan) and other indigenous populations began to experience non-Indian intrusions as early as 1829 when Hudson's Bay Company fur brigades traveled through the area on the way to California. Cattle drovers moved north through the area from California to the Willamette Valley in the 1830s. The building of the Scott-Applegate Road in 1846, discovery of gold in northern California in 1848, and mining in Oregon Territory by the early 1850s increased the non-Indian presence.

The Takelma and associated people were commonly known to miners and settlers as the Rogues, with reference to their occupation of areas near the Rogue River and its tributaries such as the Illinois and Applegate rivers. The Illinois River is about 10 miles due west of Oregon Caves. The Territorial Governor initiated attempts to effect a treaty with the Rogues in 1850. Following armed conflict with non-Indians in which Rogues, Shastas and Klamaths formed an unsuccessful alliance, an 1853 treaty resulted in the establishment of the short-lived Table Rock Reservation. It was located between Grants Pass and Medford.

By early 1856, some Takelmas and others moved to the recently established Grand Ronde Reservation located far to the north (northwest of Salem). Members of other tribes (Umpqua Valley Yoncallas and Southern Molalas) were already at Grand Ronde. Most of the Rogues and Shastas at Grand Ronde (about 850 individuals out of a total of approximately 1900) were moved to the Siletz Reservation by May of 1857. About 60 Rogues and Shastas remained at Grand Ronde.

People identified as Takelma significantly declined to 27 by 1884. In 1905 only 3 or 4 Takelma speakers were at the Siletz Reservation and only 3 at Grand Ronde. By the 1970s "...there were no Takelma speakers; those people of Takelma descent remembered their ancestry as 'Rogue Rivers' or 'Cow Creeks' (Kendall 1990, p. 592)."

In summary, the Takelma people do not continue to exist as a recognizable Indian population. However, descendants may reside on at least two contemporary reservations: Grand Ronde and Siletz. Both of these reservations are a considerable distance from Oregon Caves, in the area of Salem. Given the interactions with other tribes, it is possible that some Takelma descendants also are members of more closely associated reservations in southwestern Oregon (Kendall 1990, Ruby 1989).)

Historic Resources and Cultural Landscapes

The Monument contains significant historic buildings and structures within a designed landscape that is listed in the National Register of Historic Places. The information that follows is excerpted from the National Register nomination form, prepared by Crater Lake National Park historian Stephen R. Mark in 1991, and the Cultural Landscape Inventory of Oregon Caves National Monument, prepared by the Cultural Resources Division of the National Park Service, former Pacific Northwest Region, in 1992.

The earliest cultural resource documentation at the Monument occurred in 1976. Alan C. Reynolds completed the Classified Structures Field Inventory to identify significant buildings and note their general condition. This baseline data was followed by a comprehensive inventory of historic buildings at the Monument, conducted by an architect in 1984 under the direction of the Cultural Resources Division, National Park Service, Pacific Northwest Regional Office (now the Columbia Cascades Support Office, located in Seattle). Information on structures more than 40 years old was recorded on standardized inventory cards produced by the Cultural Resources Division. Thirteen buildings at the Monument were inventoried; 12 were determined to be eligible for the National Register of Historic Places either individually as examples of rustic architecture or as contributing structures within the historic district. Of the 12 eligible structures, seven (the Concession Cottages) were demolished in 1988 because of their deteriorated condition and their location above the cave system was believed to pose a potentially negative impact upon the cave, the Monument's primary resource. All of the buildings identified in the inventory were evaluated within the context established by the major themes of historic significance identified for the Monument—Park Development and Rustic Architecture—and National Register criteria. A National Register nomination was prepared by Steve Mark in 1991 for the Oregon Caves Historic District, and official listing occurred in 1992.

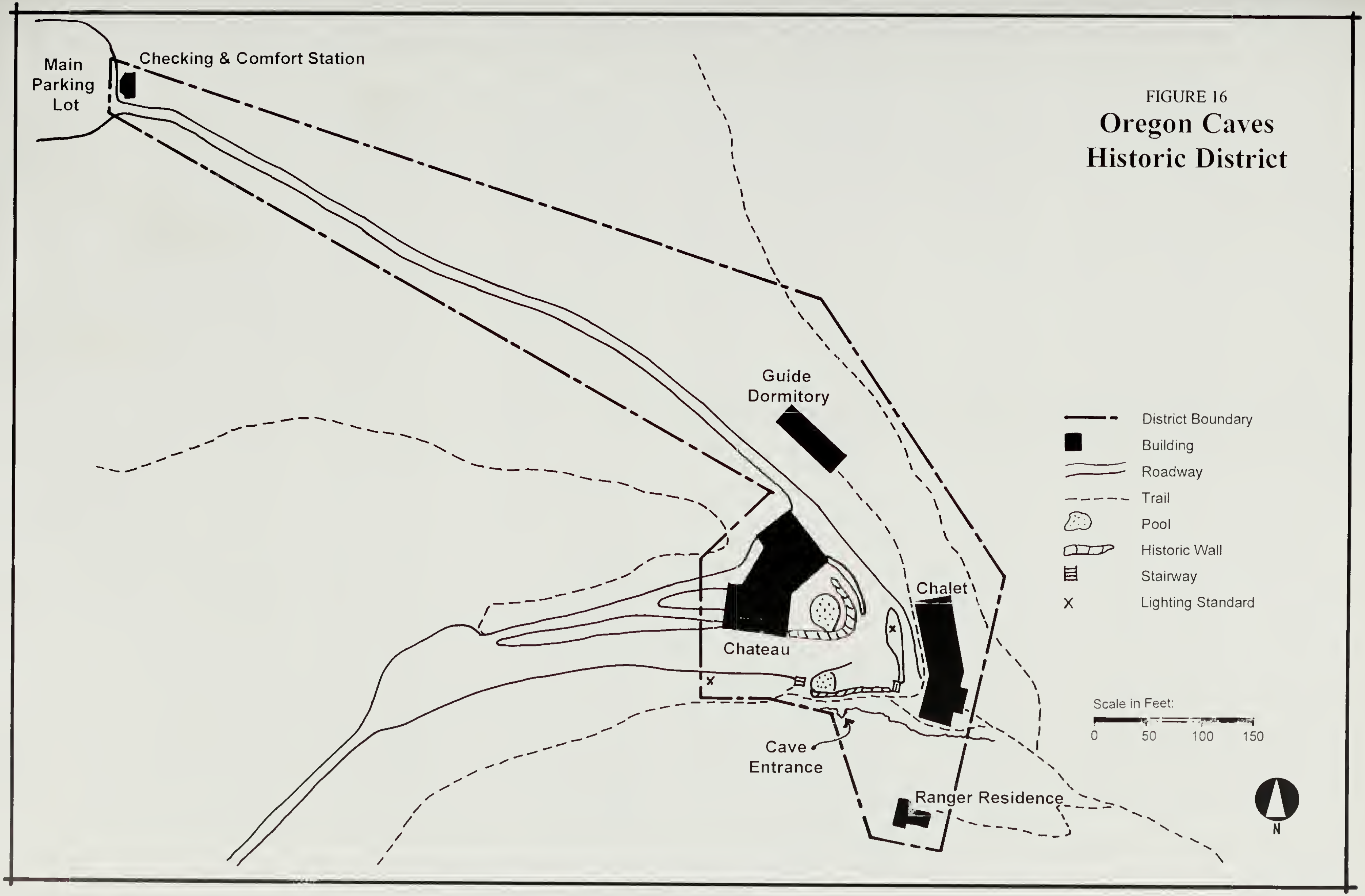
The National Register nomination for the Monument identified the historic district as a designed landscape, a type of cultural landscape as defined in Cultural Resources Management Guidelines, NPS-28. The district consists of five buildings and two rock walls within a significant historic designed landscape that takes in most of the developed area of the Monument. Cut along the side of a canyon formed by Cave Creek is a narrow roadway that connects the cave entrance with two parking areas. The buildings include the Chateau (1929, but completed and opened in 1934), Chalet (1942), Ranger Residence (1936), Guide Dormitory (1927), and the Checking and Comfort Station (1941). (See Figure 16, Oregon Caves Historic District.)

All of the historic structures in the landscape were intended to harmonize with the surrounding topography through the use of a naturalistic design called rustic architecture. The use of Port Orford cedar bark as sheathing for building exteriors, and the use of local marble and limestone for rock walls, distinguishes the materials used in the district. What evolved at Oregon Caves on approximately six acres was sensitive to the nearby canyons and mixed conifer forest, so that structures and landscape features seem to be part of the natural environment. Collectively, the contributing structures embody the essential philosophies, themes, materials and character of rustic architecture as practiced between 1922 and 1942 in western national parks and monuments. Although the site was originally developed by the Monument's concessioner when it was under USFS administration, there is an unusual continuity between these structures and landscape features and those constructed by the CCC under NPS direction.

Significant landscape features within the National Register historic district range from major features such as roads and trails, to the shaggy cedar bark sheathing, and stonework used in the rock walls. Principle features of the designed landscape are described as follows: structures skillfully sited into the forested canyon on an

FIGURE 16

Oregon Caves Historic District



improved bench with minor disturbance to the surrounding natural topography, the use of cedar bark sheathing and native stone to integrate the structures with the surrounding landscape, and the practical and aesthetic use of native plant materials, both in terms of location and massing, to provide shade and accent. Signs, benches, and ponds, one with a small waterfall feeding it, are small-scale elements that add to the richness of the designed landscape. The building materials, vegetation, circulation, organization and arrangement of the component parts collectively bring key aspects of the rustic style and naturalistic design together into a cohesive landscape composition that has great significance.

Prior to National Register listing, an Historic American Building Survey documentation project was completed during 1988 and 1989 at the Monument for the Concession Cottages (removed 1988) and the Ranger Residence, Chalet, and Chateau. The Ranger Residence was threatened with removal for the same reasons as the Concessions Cottages, but it has since been restored and adaptively reused as office space for the resource management staff.

In 1986, an evaluation of the historic buildings took place as part of the "Architecture in the Parks" National Historic Landmark Theme Study sponsored by the National Historic Landmark program in Washington D.C. As a result of that study, the Oregon Caves Chateau, considered an outstanding building within the district, was designated a NHL in 1987. The boundaries of the NHL are within the historic district boundaries and include the building and its courtyard, fish pools, the roadway in front of the hotel, and the walkway between the Chalet and the main cave entrance.

In 1992, the Cultural Resources Division completed a cultural landscape inventory of the Monument, documenting the site's history and significance and analyzing and evaluating its cultural landscape components in a comprehensive manner.

Of the five historic buildings in the historic district, three are operated by a private corporation (concessioner) which retains possessory interest in the properties—the Chateau, Chalet, and Guide Dormitory. The NPS occupies the remaining two buildings in the district—the Ranger Residence and the Checking and Comfort Station. The concessioner works with the NPS to ensure that alterations and upgrades to the historic buildings and cultural landscape do not adversely impact the National Register historic district's historic integrity. Legal title to all buildings is held by the United States of America.

Collections

As early as 1928, people have been at Oregon Caves collecting specimens for research or other purposes. The first known collector was an Italian entomologist who collected three types of specimens and took them back to Europe. This visit was followed by a coleopterist who collected beetles in the cave in 1934; the specimens are believed to be housed at Oregon State University. Herbarium specimens, spiders, arthropods, and pseudoscorpions are all documented as having been collected in the Monument over the years.

In 1987 the curator from Crater Lake National Park completed the accessioning of most of the Monument's collections. A year later, the first known cataloging of the Monument's collections began and was completed under contract with a museum in Idaho. In 1989, the remaining collections at the Monument were transferred from the Ranger Residence, where they had been stored, to a deteriorated and rodent-infested quonset hut a few miles outside the Monument (at the administrative site for the Monument). In 1990, the Monument's herbarium collection was transferred back and an additional 188 herbarium specimens were catalogued. The collection and organization of historical files and potential archival materials began to be collected in 1991 by Monument staff.

In 1994 the museum collection was still housed in the substandard quonset hut. As a result, the birds, mammals, and insects were moved into museum storage at Crater Lake National Park to ensure their safekeeping. At the present time, the herbarium collection and a small collection of historical and archeological materials remain in the Monument. In 1995, the Monument's collections were removed from the quonset hut and transferred back for temporary storage to the Ranger Residence, which has been rehabilitated for use as a resource management office.

The *Oregon Caves National Monument Collections Management Plan* was prepared in 1995 by a multi-specialty team of NPS professionals from various offices after a site visit in 1994. The team recommended that the Monument not store any collections at the present time, because no space or facility was available to protect the museum collections adequately. The short-term solution that was recommended and implemented was to remove the materials stored in the quonset hut cabinets and relocate them to Crater Lake National Park.

There appear to be significant historic furnishings located in the NHL building known as the Chateau. These are owned by the concessioner that operates the hotel. Wall telephones, chairs, lighting fixtures, among other items, have never been inventoried and assessed for consideration as museum objects for the Monument's collection. This was another recommendation put forth by the Collections Management Plan team. (Items attached to buildings, such as light fixtures are considered part of the real property and are not furnishings, which are classified as personal property. Personal property is owned outright by the concessioner.)

There is a strong desire by Monument staff to expand the collections that document the natural environment of Oregon Caves National Monument. The lack of physical space and professional staff make this expansion of the collection an impossibility at the present time. A MOU between the Monument and Crater Lake National Park exists to provide a temporary solution. However, the collection storage at Crater Lake National Park is also inadequate.

Interpretation

Interpretive Themes

There are six park-level themes for cave tours, each of which has associated program level themes.

I. People: The human history of the Monument shows that people can enjoy and protect the cave.
- Cave restoration seeks to mitigate impacts of humans on the cave
- The NPS manages the cave to balance enjoyment and preservation
- People derive unique experiences, emotions, and value from the cave
- Changing human perceptions have influenced our actions toward the cave

II. Geology: Oregon Caves and the surrounding Siskiyou Mountains represent a unique tectonic and volcanic setting.
- Diverse geologic processes formed Oregon Caves, and many are still changing the cave today

- The unique geology of this region is responsible for making this one of the most botanically diverse provinces in the west
- Geology controls the historic and present hydrogeology of Oregon Caves

III. Ecosystems: The cave ecosystem, like any ecosystem, is dynamic.
- The cave is a complex, interdependent ecosystem that is vulnerable to dramatic upsets
- The cave is a natural low-energy ecosystem
- The cave ecosystem is always changing, often in cycles that are in balance

IV. Watersheds: Oregon Caves National Monument represents an undisturbed, old-growth forest watershed.
- Ecologic integrity and water quality are important to cave health and development
- Limestone caves record the hydrogeologic history of ancient watersheds
- Oregon Caves gives visitors an opportunity to see the subsurface hydrogeology of a watershed at work

V. Cave Life
- The cave's collection of Pleistocene fossils supplies a valuable index of regional changes in fauna since the last Ice Age
- Oregon Caves supports a fauna of troglobites, troglophiles and trogloxenes
- Human activity in the cave has impacted cave life

VI. Human History
- Human behavior in cave environments has changed over the past 100 years
- The CCC was instrumental in the development of the historic plaza area as well as construction of the trail used by tours today
- Cave restoration addressed many problems caused by early misconceptions about cave environments
- The understanding of forest fires and the philosophy of fire suppression over the past 80 years has altered historic forest stands and the chemistry of water that has traditionally interacted with the cave environment

Other major interpretive themes for the entire Monument also include:
- The structural diversity of the old-growth forest at the Monument provides diverse habitat for animals
- The Monument's historic district is a prime example of the naturalistic style of rustic architecture which blends the built environment with the natural environment
- The Siskiyou-Klamath region surrounding the Monument may be one of the most botanically diverse regions in the west
- The health of the Monument's watersheds and other watersheds in the surrounding region are critical to the health of anadromous fish species (such as salmon and steelhead)

Issues Related to Interpretation

Appropriate Use of the Illinois Valley Visitor Center

All agencies involved in the financing and development of the IVVC have agreed that one of the primary purposes of the visitor center is the mutually beneficial promotion of tourism and recreation in southwest Oregon. This purpose should also include tourism and recreation opportunities in surrounding areas such as Redwood National Park and USFS Six Rivers National Recreation Area (NRA) which are both located in northern California along the Highway 199 corridor, a route traveled by tourists who come to the Monument.

Del Norte County and Six Rivers NRA staff are following this trend of tourist movement by development of the "Coast to Caves" mountain bike trail, a route that will extend from Redwood National Park to the Monument through USFS and BLM management units in both California and Oregon. In addition, the IVVC could provide information on the USFS Marble Mountains Wilderness Area of northern California which has a cave system that sits in a geologic setting similar to Oregon Caves.

Since no visitor center or museum in the region is presently interpreting the unique resources of the Klamath/Siskiyou bioregion, the visitor center could interpret these outstanding natural and cultural resources.

The current MOU among visitor center partners states that the NPS will take the lead in interpretive planning. The visitor center will be included in the upcoming long-range interpretive planning process and has the potential to serve a greater role in providing services to Monument visitors.

Visitor Services

Personal Interpretation

Currently, the NPS interpretive staff includes one full-time interpreter who functions as Chief of Interpretation and Visitor Services; one full-time subject to furlough interpreter who also is the Monument's collateral duty Law Enforcement officer, Safety Officer, Concessions Evaluator, and Emergency Medical Services coordinator, and three temporary (summer) interpreters who primarily conduct the Monument's interpretive program. The summer interpretive program includes a nightly Chateau Program, a Campground Program on Friday and Saturday nights at Grayback Campground, and a daily Naturalist Choice program. Interpretive staff also conduct roving interpretation, occasionally staff the information booth (in the Checking and Comfort Station), and maintain support services such as library, slide file, and visitor information requests.

Cave Interpretation Currently, personal interpretation of the primary resource of the Monument, the cave tour, is contracted to a private concessioner. The NPS creates standards and guidelines for cave tours (documents include Goals and Objectives, Themes, Audit Standards, and annual Concession Operations Plans), assists with a limited amount of guide training, evaluates individual guides through certification audits, and conducts periodic concession evaluations. Operations details can be included in concession or other types of contracts, but these contractual agreements are not easily adapted to changing visitor trends or resource protection needs. The NPS does not directly supervise the cave guide staff.

Non-personal Interpretation

Approximately 25,000-30,000 of the visitors to the Monument are children under the age of 18 (estimated from the results of the 1995 Oregon Caves visitor study). Activities and interpretive media geared to their interest and level of understanding is currently available through a Junior Ranger program that is presented as a one-page activity sheet in the Monument newspaper. The interpretive staff is currently developing an activity book with a more diverse and age-appropriate assortment of resource oriented activities.

There appears to be an increase in international visitors to the Monument. Many of these people have a limited knowledge of the English language and hence have difficulty understanding safety and resource preservation messages. Translations are being developed to address the needs of these individuals. Translations developed for the Oregon Caves will also be put on the Internet to provide information that is understandable and appealing to Internet users who are looking for a unique and resource rich vacation destination in this country. Development of this information will consider resources within the region adjacent to the Monument. Existing non-personal interpretive facilities at the Monument include the following: an information booth with free publications (Monument newspaper, folder, and site bulletins), a bulletin board, and an interactive computer providing general orientation and interpretation. The interactive computer is not designed to be used in an outdoor setting and glare is a significant problem. Due to staff shortages, the booth is staffed irregularly in summer by an interpretive ranger.

An outdoor kiosk is located at the main parking lot and houses a bulletin board and two embedded fiberglass panels containing orientation information on cave tours and hiking trails.

A new interpretive exhibit was installed in the summer of 1997. The exhibit consists of two porcelain enamel panels (five feet by seven feet) placed in the Chalet breezeway. The exhibit interprets the biological and geological diversity above and below ground at the Monument. These exhibits are costly to develop and produce, and should be protected from vandalism in an indoor setting.

Temporary exhibits are located in the Chateau lobby. Currently, the exhibit contains photographs describing how natural resources are preserved at the Monument.

The Cliff Nature Trail, which begins at the cave's main exit, contains wayside panels describing some of the interrelationships between surface and cave ecosystems. There is a routed wooden sign at the Big Tree describing its dimensions.

Pre-visit information materials include the park newspaper and folder (sent by request). Additionally, park staff are producing illustrated site bulletins for student information requests.

There is a Travelers Information Station radio message broadcast at the IVVC. This message contains information a visitor needs to know before proceeding 20 miles to the Monument.

Currently, there is no on-site visitor center at the Monument, and consequently no place where visitors can look at exhibits, view an audio visual program, or ask questions of a ranger. There is also no indoor place where Monument staff may assemble school groups participating in the "Troglo-buddies" curriculum school program.

As on-site facilities are limited, daytime ranger programs are currently presented outdoors between the entry drive and the Chateau coffee shop. In the evening, programs are provided in the reception lobby of the Chateau. Visitor safety and resource preservation are among the topics presented to the public.

Community and School Outreach

Monument staff recently secured a National Park Foundation grant and developed a curriculum based education program called "Troglo-buddies". In spring and fall, fourth through seventh grade students explore ecological concepts related to the cave and forest ecosystems through a series of six activities conducted in the classroom and at the Monument. A printed curriculum guide will be provided to all local schools in Josephine and Jackson counties, and an electronic version will also be available on the Internet. The program requires a staff of at least three interpreters, which is not guaranteed from year to year, and a place where school groups can assemble out of the rain, which is currently not available. Other community interpretive programs include a traveling exhibit which allows the NPS to participate in regional fairs and community events. Monument staff often speak at community group meetings on topics related to the natural and cultural history of the Monument.

Visitor Use

Visitor Use Patterns

There has been a slight downward trend in visitation in the last 15 years and, more recently, an even stronger trend toward visitation that fluctuates from year to year. No studies have been conducted to determine possible reasons for visitation declines relative to the 1970s. A variety of theories exist that presume declines are related to changes in family structure, reduced advertising by the concessioner, increases in tour rates, competition from increasing numbers of tourism opportunities in the vicinity, better pre-visit information at the IVVC, and other socioeconomic or demographic factors. The actual causes are likely a combination of these factors. Without verifiable data, these theories are purely speculation. Recent visitation trends at Oregon Caves National Monument have generally reflected patterns at similar NPS sites and tourism facilities in southwest Oregon.

Visitation data for each month in 1995 and 1996 as well as annual figures for the last 20 years are included following.

Annual Visitation to Oregon Caves National Monument 1976-1996

Year	Visitation	Year	Visitation	Year	Visitation
1996	98,903	1989	103,597	1982	115,953
1995	103,576	1988	117,525	1981	136,085
1994	97,806	1987	103,600	1980	129,760
1993	97,743	1986	102,568	1979	131,318
1992	86,607	1985	94,668	1978	173,130
1991	99,541	1984	119,258	1977	181,870
1990	99,638	1983	114,805	1976	172,517

Monthly Cave Visitation and Total Monument Visitation for 1995 and 1996

1995	Cave Visits	Total Visits	1996	Cave Visits	Total Visits
January*	307	1,269	January	387	2,046
February*	0	467	February	534	2,370
March	1,740	3,580	March	2,543	4,628
April	2,651	5,153	April	2,686	5,860
May	4,850	8,343	May	4,489	8,608
June	8,805	13,658	June	8,112	12,865
July	17,657	20,713	July	16,682	20,748
August	19,372	22,627	August	19,024	22,722
September	7,473	13, 383	September	6,403	10,128
October	2,794	7,658	October	4,881	5,493
November	1,312	4,699	November	1,312	4,699
December	321	2,026	December	321	2,026

*The cave was closed January 16 - February 28 for cave trail construction

In the first half of the 1980s, average annual visitation was approximately 118,400. The second half of the 1980s saw an annual average of approximately 104,400 visitors to the Monument. In the first half of the 1990s, average annual visitation was approximately 98,700 (disregarding 1992 which was an anomaly with 86,600 visitors). Visitation in 1995 was the highest yet in the 1990s decade with a total of 103,576 visitors. As expected, the peak visitation occurs in July and August, with 20,700 visitors in July of 1995 and 1996, and 22,700 visitors in August of 1995 and 1996.

The percentage of total Monument visitors who go on a cave tour has also fluctuated. A visitor survey conducted in the summer of 1995 indicated that 94% of peak season visitors took the tour of the cave as part of their visit to the Monument. The changes compared to a 1970's visitor survey in the relative percentages may reflect changes in the price of a cave tour, the number of repeat visitors, the accuracy of the visitor/car ratio, the nature of non-cave related concession activities, or the number of adults who care for children too young for a cave tour. Concessioner data on cave visits includes only paid admissions for the general public tour. School and special group tours conducted by NPS and complimentary tours are not included in the totals. There has also been an increase in the use of the Chateau for lodging, dining, and special events that are not necessarily related to the cave or cave tour.

Visitor Characteristics

A visitor survey, *Oregon Caves National Monument 1995 Visitor Study,* conducted in the summer of 1995 profiled some of the socioeconomic characteristics of visitors to the Monument. The largest age group represented in the study were adults between ages 35 and 44 (35%). Visitors to Oregon Caves are typically from the western United States. They are also likely to be residents of these states' urban areas. Visitors show high levels of education, and have probably completed either college or graduate school. The average annual household income is around $50,000. Visitors often come as part of a group (mean group size was 2.4 adults and 2.1 children), with half indicating they were accompanied by children.

Sixty-six percent of respondents were first time visitors to the Monument. Most visitors stopped enroute to other destinations, with approximately ten percent staying at nearby campgrounds or hotels. Forty-three percent of respondents stopped at the IVVC before and/or after their trip to the Monument. The services that were rated as most important to visitors included the cave tour, availability of food, and availability of a visitor center.

Carrying Capacity

Carrying capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that complement the purposes of the park and its management objectives. It is affected by both physical constraints and the more subjective perceptions of what constitutes a quality recreation experience. Physical limitations at the Monument are seen in the amount of relatively fixed space available for visitor use, for example, parking spaces, the cave entrance area, and public buildings. The crucial carrying capacity issue relates to the cave, the visitor experience, and the protection of resources.

The *Oregon Caves National Monument 1995 Visitor Study* results indicate that 87% of respondents reported some degree of crowding on their cave tour, with most feeling moderately crowded. Ninety-eight percent of respondents felt that tour group size should be limited. Sixty-three percent of those respondents indicated that tour group size should be limited to an average of 14 people. Eighty-seven percent of respondents indicated that they had a standard for encounters with other groups. Eighty-seven percent of respondents indicated that encounters with other tour groups should be as minimal as possible. Eighty-two percent of respondents provided a time limit for the longest time they would be willing to wait for a cave tour before the experience became unpleasant. The mean maximum acceptable waiting time was 45 minutes.

No visitor use management plan currently exists at the Monument. Such plans need to be prepared to define both the desired resource and social conditions within the park and the levels of acceptable use that will maintain or achieve those conditions for each of the park's major management zones.

In September 1996, the NPS produced a document entitled, "Effect of Tour Size on Cave Resources at Oregon Caves." It concluded that larger tours are more likely to disturb bats and survey tags, touch formations, write graffiti, and break speleothems, largely due to lower levels of supervision and control and/or higher levels of noise.

Various studies show that visitor noise and organics (organic material inadvertently brought into the cave) affect the distribution of macroinvertebrates, bats, wall bacteria, and unbroken speleothems. Some of this appears to be the lag effects of higher visitation from past years, especially impacts on the wall bacteria. The faster reproducing bacteria in cave pools appear to be unaffected activity-wise by current cave visitation levels.

There is likely to be some impact on the above groups of species regardless of visitation levels. A reasonable approach to determining carrying capacity would be to calculate what level of use is likely to affect less than ten percent of the area used by the various populations (with fairly uniform distribution). Less than ten percent of the wall bacteria currently appear to be unaffected. The macroinvertebrates appear to be more impacted and these populations seem the best determiner of use levels. If macroinvertebrate biodiversity in traps set in a three dimensional shape enclosing ten percent of the trail area is similar to the biodiversity of traps set further from the trail, then it is unlikely that current use levels would impact so much of the populations as to cause extirpations or extinctions.

Since bat use patterns in various parts of the cave are so variable in time and space, population levels of bats seem a better way to determine carrying capacity. Since the Townsend's big-eared bat is the species most impacted by the lights and by noise from tour groups, it should be the bat species used to determine carrying capacity. The increase in the Townsend's big-eared bat's use of the cave since historic times (based on historical records) may be due to the increase in artificial habitat (tunnels) in the cave. Therefore a higher percentage of disturbance might be tolerated by this bat before it would deviate significantly from prehistoric use patterns. If more than 25 % of the total bat population (as calculated by mist-netting and sonar records) are forced to move because of tour groups, then Monument management staff would be alerted and appropiate action taken to mitigate impacts. This could include consideration of reducing both the size and/or frequency of tours during the winter months.

If the calculated deposition rate of speleothems (determined from regrowth and solubility levels) is greater than the current estimated speleothem breakage and removal by visitors, then visitation levels should be within carrying capacity. If it is not, then decreasing the tour size would likely be more effective in decreasing vandalism than would be decreasing the total number of people entering the cave.

Socioeconomic Factors

Regional Setting

Oregon Caves National Monument is located in southwestern Oregon in Josephine County within the Illinois River watershed. The Grayback and Sucker Creeks drain a 62,159 acre watershed located between the north-facing slopes of the Siskiyou Mountains and the Illinois Valley. Lower Sucker Creek flows within the broad Illinois Valley, and its upper reaches occupy narrow valley floors and canyons. The eastern and southern headwaters begin at rocky peaks, such as Grayback Mountain and Tannen Mountain. Elevations range from 1,400 feet at the mouth of Sucker Creek to 6,000 and 7,000 feet on the divides.

The Grayback/Sucker watershed is located near the geographic center of the northern third Klamath Mountains geologic province. This part of Oregon comprises approximately one-third of a richly diverse bio-geographic area known as the Klamath/Siskiyou region; the other two-thirds of the region lie in adjacent northern California. Many species are located at the southern limit of their range, while species otherwise limited to California are located in the northern limit of their range which adds to diversity. Considered an internationally known center of biodiversity, about 3,500 plant taxa have been recorded here, 280 of which are endemic to the region, including over 90 on serpentine soils. There are 30 conifer and 45 hardwood tree species, more than in either the Cascade or the Sierra Nevada ranges, and possibly more conifer species than in any other area of comparable size in the world (Vance-Borland, et al. 1996: p. 53).

According to a two year study released by the World Wildlife Fund in 1997, the Klamath and Siskiyou forests are among the five most ecologically important ecosystems (biologically diverse) in North America, but are experiencing environmental degradation (Associated Press 1997: p. 2A).

In addition to Oregon Caves National Monument, other units of the national park system in the region include Redwood National Park and the Whiskeytown Unit of Whiskeytown-Shasta-Trinity NRA. Portions of seven national forests are found here: Umpqua, Siskiyou, Rogue, Six Rivers, Klamath, Trinity, and Shasta. Ten wilderness areas are wholly or partially within the region: Grassy Knob, Kalmiopsis, Siskiyou, Red Buttes, Marble Mountains, Russian, Trinity Alps, Castle Crags, Chanchelulla, and Yolla Bolly-Middle Eel. The region also contains whole or partial segments of seven national wild and scenic rivers: Elk, Lower Rogue, Illinois, Chetco, Smith, Lower Klamath and Trinity. These areas, as well as numerous non-federal park and recreation facilities managed by state, local, and private entities throughout the region, provide extensive outdoor recreation opportunities. (Refer to Figure 1, Greater Siskiyou Ecosystem in Background of the Park chapter.)

The region's largest cities include Medford and Grants Pass, Oregon, (55,090 and 20,255 population respectively, 1995 census update) and Redding, California (78,490 population, 1995 census update). The economy is influenced heavily by timber, mining, and service industries, with tourism an important contributor. Major highways serving the region include Interstate 5 and U.S. Highways 101 and 199. Regularly scheduled commercial air service is available at Medford and Redding.

Contemporary Tribal Communities

Although there are no American Indian communities in Josephine County, members of the Takelma native populations who had occupied southeastern Oregon in the vicinity of Oregon Caves ended up residing at what are now two contemporary federally recognized American Indian tribes in northwestern Oregon, the Confederated Tribes of the Grand Ronde Community and the Confederated Tribes of Siletz Indians, in 1856 and 1857. As early as 1884 there may have been no more than 27 Takelma at the Siletz reservation and by 1905 there were only three or four speakers of the Takelma language at Siletz and two at Grand Ronde (Sapir 1907: p.256). By the 1970s "...there were no Takelma speakers; those people who were of Takelma descent remembered their ancestry as 'Rogue Rivers' or 'Cow Creeks' (Kendall 1990: p.592)." Despite these factors and the distance of the two reservations from Oregon Caves, the GMP/EIS was provided to both Confederated Tribes for their review and comment.

Josephine County

Population in Josephine county grew by 6.4% between 1980 and 1990. The retirement community also grew, bringing money and stimulating service employment, especially medical. Employment related to wood products and manufacturing has declined steadily as trade and service employment has increased steeply. The reduction of federal timber harvest has encouraged harvest on private land which is currently at its highest level ever. Reduction in federal harvest has also contributed to layoffs at local mills and logging companies. The unemployment rate for Josephine County (7.8%) was the highest in Oregon for September 1994.

There are no federally recognized American Indian tribes or contemporary American Indian communities in Josephine County.

As Josephine County and southern Oregon develop their tourism industry, the Monument will continue playing a significant role in the area's socioeconomic environment. Currently, the Monument is a primary tourism destination point in southwest Oregon. Pristine forests, outstanding cave formations, and historic structures offer visitors excellent recreational and educational opportunities. The average visitor spends two and one-half to three hours at the Monument, thus allowing an opportunity to visit the park and other regional attractions in a single day. Although support services such as food and lodging are available on site, most visitors utilize lodging, food, and gasoline services from the local community. With more than 100,000 visitors annually, the impact on a small community is substantial.

Federal Government Receipts

Josephine County indirectly receives federal monies though federal land management activities. Payments are typically made to the state and then disbursed to the appropriate counties. Following is a description of the source of these revenues.

Timber Sales Josephine County indirectly receives 25% of gross sales on USFS lands within the county. On Oregon and California (O & C) Revested lands, an additional 25% of gross timber sale receipts are returned to the state to be distributed to the various O & C counties. The SNF designation of the lands surrounding the Monument as a LSR has considerably slowed timber harvest on these LSR lands which are not part of the general harvest quota for the national forest. The corresponding federal timber sale contribution of these lands back to the county is already greatly reduced. An exception to the reduction on cutting in the LSR are timber sales made prior to establishing the existing contracts.

Public Law 103-66, "owl guarantee" payments were authorized to mitigate local impact of the loss of timber harvest revenues due to the Endangered Species Act ruling on the decline of the northern spotted owl. These rate payments are based on historic harvests prior to the owl ruling. These payments are set by legislation and are authorized for a limited time period.

Payments in Lieu of Taxes Another form of federal payment is made to compensate counties since they do not receive property taxes on federally managed lands. This "payment in lieu of taxes" is based upon the acreage of qualifying federal "entitlement" land and population of the county. Both the NPS and USFS make payments to Josephine County through this program.

Location and Access

The Monument is located in the southwest corner of the State of Oregon about 19 miles southeast of its gateway community of Cave Junction. Grants Pass, Oregon, is about 50 miles northwest of the Monument. Medford, Oregon, is approximately 80 miles distant. The Monument receives regular visitation and use from the populations of these communities. Crescent City, California is located on the coast, just south of the Oregon border and approximately 70 miles from Oregon Caves. (Refer to Figure 1, Greater Siskiyou Ecosystem.)

Cave Junction, population 1200, is the third largest incorporated community in Josephine County. Although the population within the city limits is small, the town serves an additional ten to twelve thousand residents of the surrounding Illinois Valley. The city includes several bank branches, supermarkets, restaurants, service stations and two motel facilities. A small clinic serves the medical needs of the community. Most support facilities and amenities desired by visitors to national park areas are available within the city or the Illinois Valley.

Most of the cities and towns in the vicinity of the Monument contain timber-dependent or related industries and are transitioning into more diversified economies. Tourism and recreation and associated support facilities and services weigh heavily in this transition.

Primary access to Oregon Caves National Monument is by a paved, two lane, highway, State Route 46, also known as Caves Highway. This highway originates at its intersection with U.S. Highway 199 on the south end of Cave Junction and terminates at the Monument's northwest boundary. State Route 46 is the sole paved roadway into the Monument.

The first 12 miles of Caves Highway from Cave Junction are appropriate for all types of passenger and commercial vehicles. The last seven miles are narrow, steep and winding. Some sections are more narrow than acceptable state standards for lane width. Large trucks, delivery vehicles, buses, RVs and cars with trailers have difficulty negotiating the final few miles into the Monument. Advisory signs recommending against these types of vehicles are posted in Cave Junction and again at USFS Grayback Campground by the Oregon Department of Transportation.

The Lake Creek Bridge, approximately one mile from the Monument, has been replaced with a temporary single lane structure. Traffic flow is controlled by signal lights. There are no weight or length restrictions. The bridge is scheduled for permanent replacement as a two lane structure in the fall of 1999.

U.S. Highway 199, the Redwood Highway, runs between Grants Pass and Crescent City, California. It is the only direct access in southern Oregon between Interstate 5 and the California and Oregon coastal areas. As such, it receives significant recreational traffic from visitors to the general area. U.S. Highway 199 is essentially the sole feeder route for State Route 46.

The Monument can also be reached by USFS Road 960. This road enters the Monument near the northwest corner at the main parking area. Route 960 connects with USFS Roads 070 and 4611 and then a series of interconnecting USFS roads that provide access with the Town of Williams, Caves Highway, and other points in the Illinois Valley. The forest road system is passable but is primarily dirt and gravel surfaced. The road system was designed for logging and fire control access. This system is used by a small number of visitors, mostly those not wishing to retrace their route to Grants Pass or Medford. There is moderate interest in the use of this road for access to Oregon Caves National Monument, and it would likely be better utilized if the surfacing was upgraded. USFS Road 960 and 070 serve as the alternative evacuation route for the Monument in the event that wildfire should close State Route 46. The forest roads are generally closed by snow from December to May. Prior to construction of Caves Highway in 1922, the road (primarily a trail) through the forest to Williams was the primary access to the Monument.

A portion of USFS Road 960, as well as a short, dead-end spur section of USFS Road 070 would be included within the proposed Monument boundaries under Alternatives C and D. These road sections are located within sections 10, 11, 14 and 15 of the plot designated Township 40 South, Range 6 West on USGS maps.

Current Highway Planning

There are no current plans to upgrade State Route 46 or USFS Roads that provide access to the Monument. A contract was issued in October, 1996, for replacement of the Lake Creek Bridge, located about one mile from the Monument entrance on State Route 46. Once completed, the new bridge would allow access to the Monument by heavy vehicles, such as large trucks and buses. Scheduled completion date is spring, 1998.

In June, 1996, the Oregon Department of Transportation convened a Corridor 199/46 Planning Commission to study and coordinate long-range plans and improvements to U.S. Highway 199 and State Route 46. This comprehensive effort will explore various alternatives to improve all aspects of transportation that will affect communities, land owners, public and private agencies and businesses located along these highways. Studies will combine long-term planning with specific highway improvement projects. Partnerships, transportation alternatives, and cost effectiveness will be priorities.

Relationship to Regional Tourism

Oregon Caves National Monument is one of the primary visitor attractions in southwestern Oregon. Historic development of the Monument was linked to the development of a tourism industry in the area. Both the communities of Grants Pass and Cave Junction have identified with the Oregon Caves over the years. Business and recreational references to caves or "caveman" are prevalent in the communities. As outdoor recreational facilities and opportunities have diversified, the Oregon Caves connection with the Grants Pass area has become less strong.

Nevertheless, the Monument still plays an important role in regional tourism for southern Oregon. The Money Generation Model figures provided by Ken Hornback, of the National Park Service's Denver Service Center, indicate that the Monument generated approximately $2.6 million in direct spending and $4.6 million in total spending in the area in 1995. An estimated 84 jobs were reliant upon this spending.

A tourism assessment of the Illinois Valley was completed in June 1994 for the Oregon Economic Development Department and Rural Development Initiatives, Incorporated. The study, *1994 Illinois Valley Tourism Assessment*, conducted by Michael Wetter and Associates of Salem, Oregon, was designed to complete the following tasks:

- Determine the particular dynamics of the tourism industry in the community
- Identify and outline potential tourism development strategies
- Provide basic information about the economic potential, viability, and environmental or social impacts of the strategies

The summary of the analysis refers to Oregon Caves National Monument as "...an attraction of national significance." It further offers that "...one natural direction for the community to take would be to explore tourism that is based on packaging the Oregon Caves and the wilderness and botanical areas for their geological, botanical and biological interest." The report views the Monument as a "centerpiece attraction" for the tourism industry of the area.

Wetter's analysis concludes that "...a key to success will be for the Illinois Valley community to continue to work with the NPS to help attract new cave visitors, help visitors fully experience the caves, and to sell them on exploring more of what there is to do in the Illinois Valley. The partnership between the community and the park service is very important."

Early in its history the Monument was a destination site. In more recent years, Oregon Caves National Monument has evolved into primarily a day-use area. Visitors spend an average of two and one-half to three hours at the site. A very small number (less than one percent) utilize the Chateau for overnight accommodations. While the primary use is experience of the public cave tour, use of other recreational and visitor facilities occurs. A small number of local or regional clientele use the Chateau dining room and an increasing number of local and transient visitors are using the surface trail system. Cross-county skiing and snowshoeing use has increased over the past few years. Alternatives in this plan that list boundary adjustments would incorporate areas of interest, such as Bigelow Lakes, that could be expected to expand visitor opportunities on the Monument.

Illinois Valley Visitor Center

In 1978, a boundary change authorized 7.98 acres in Cave Junction for the purpose of establishing an information/visitor center. The NPS administers 4.03 acres of land located within the city limits of Cave Junction on State Highway 46 near the corner of Redwood Highway as the IVVC. The remaining acreage (3.95 acres) was sold because the NPS determined that the need for a visitor center could be accomplished within the smaller, four acre parcel. The City of Cave Junction now owns this parcel and plans to develop a water treatment plant.

In August, 1990, construction of the IVVC was completed under a challenge cost-share agreement among the USFS, State of Oregon, Josephine County, City of Cave Junction, Illinois Valley Chamber of Commerce, Rough and Ready Lumber Company and the NPS. (The NPS purchased the land, and the cost of actual site development was shared.)

The visitor center is managed through a MOU with Josephine County, the City of Cave Junction, the Cave Junction Chamber of Commerce, the BLM, USFS, and NPS. The center is staffed by the USFS, community work program employees, an NPS summer seasonal, and the Illinois Valley Chamber of Commerce staff.

The Monument entered into an interagency agreement with the SNF for operation and maintenance of the center. Under the agreement, the facility is operated by the USFS. The Monument provides partial funding for a staff position (site manager) at the visitor center. The position is administered by the USFS but NPS has input into position management and oversight. The Monument maintenance division carries out all grounds and cyclic maintenance at the center. Direct cost of NPS participation in FY 94 was approximately $30,000. The agreements and operating plan were revised in 1995.

Approximately 25-35% of Oregon Caves National Monument visitors stop at the IVVC before or after their trip to Oregon Caves. About 720 square feet of the building is used for public contact and information. Services provided in this space include a Crater Lake Natural History Association sales outlet, a staffed information desk, in-house produced temporary exhibits, two interactive computers with information about Oregon Caves National Monument and attractions in southern Oregon, a Chamber of Commerce brochure rack, and restrooms. In recent years, a small meeting/conference room in the building has been converted into Illinois Valley Chamber of Commerce offices due to space shortages. The NPS provides direct support of the visitor center through operations funds, one NPS temporary interpreter (May through September), production of exhibits, development and maintenance of the Oregon Caves interactive computer, and an information kiosk outside.

Crater Lake Natural History Association

The Crater Lake Natural History Association is a nonprofit organization working with NPS to provide programs of education, interpretation, and research at both Crater Lake National Park and Oregon Caves National Monument. An association sales outlet at the IVVC offers selected publications, maps, price lists, order forms and applications for membership in the Association. The Association also publishes the *Oregon Caves Underworld*, the Monument's newsletter for visitors.

Land Use and Ownership Patterns

The Monument is highly valued by individuals and groups, both local and national in composition, for its preservation of a small section of the Siskiyou Mountains' transitional, old-growth forest. All land immediately surrounding the Monument is publicly owned and administered by the U.S. Department of Agriculture, Forest Service, Siskiyou National Forest. Many of the areas adjacent to the Monument have been heavily impacted by road building, clearcutting and other timber harvesting prescriptions. Most of the management activities on the surrounding forest were carried out from the 1960s to the 1980s, though some timber sales are currently active along the Monument's northern, southern and western boundaries. The current sales are holdover units that pre-date the present forest plan for the SNF.

As part of the *Northwest Forest Plan*, most of the area surrounding the Monument has been placed into LSR status. Some Matrix land (open for timber harvest) occurs north of the Monument in the Grayback Creek drainage and south of the Monument in the Sucker Creek drainage. Late-Successional Reserve status places significant restrictions on timber harvest alternatives. Sales and logging are still permitted adjacent to Oregon Caves National Monument as long as the prescriptions meet the requirement of the LSR.

The original 1907 withdrawal, which covers the remaining approximately 2,080 acres surrounding the Monument in sections 9, 10, 15, and 16 does preclude mining of locatable minerals, such as gold. The withdrawal does not affect mineral leasing, such as oil and gas exploration. This withdrawal also does not effect general timber harvest and is subject to periodic review for termination.

The SNF has issued an outfitter guide permit for horseback riding in the Bigelow Lakes/upper Lake Creek area. Guided rides are led along the Mount Elijah, Boundary and Elk Creek trails. The RRNF is in the process of updating a longstanding grazing permit, a portion of which also covers the upper Lake Creek area. The cattle and horse grazing permit is considered in the Big Grayback Allotment Management Plan administered by the Applegate Ranger District of the Rogue River National Forest. About 2,812 acres of the 19,710 acre allotment are located on the SNF in the vicinity of Oregon Caves National Monument.

The area to the north and northeast of the Monument, representing the upper Lake Creek drainage, is the primary watershed for both public and non-public drinking water supplies for the Monument. A surface water intake is located on Lake Creek in section 10 about one-half mile upstream from the intersection of the creek andUSFS Road 960.

Political Context

A general knowledge of the political setting influencing federal land policy is helpful in understanding the external forces affecting lands around the Monument. The USFS is a federal land management agency whose mandate is to provide a management program to provide for multiple uses and protection of the forest resources. The agency must fulfill legislative requirements, and address local, regional and national issues and concerns. Conflicts between different uses and values often occur.

Ancient Forest Controversy

In 1989, the northern spotted owl was proposed for listing as threatened under the Endangered Species Act. The northern spotted owl, along with other species such as the marbled murrelets and salmon, was in decline due to past timber harvesting and fragmentation of older forests. In a landmark decision in 1991, Federal Judge William Dwyer enjoined timber harvest from federal lands inhabited by the spotted owl. Logging was suspended on Pacific Northwest federal forests until the USFS and BLM submitted a plan that would comply with environmental laws.

Hoping to break the timber impasse, a team of scientists produced a *Record of Decision* and accompanying *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl* (commonly referred to as the *Northwest Forest Plan*). In December 1994, Judge Dwyer ruled that the plan met the court's requirements and lifted the injunction on logging.

1995-1996

Salvage Rider On July 27, 1995 legislation intended to increase logging in Northwest federal forests, known as the "salvage rider", Section 2001 of the 1995 Rescissions Act (Public Law 194-19) eliminated virtually all legal safeguards for federal timber sales through the end of 1996. The rider expired and has not been renewed.

Section 2001(d) of the salvage rider exempted from all other laws any timber sale on federal lands covered by the *Northwest Forest Plan*. The rider also removed such sales from administrative appeal.

Section 2001(k) ordered the USFS and BLM to release for cutting all timber sales in Oregon and Washington that had been offered for sale since 1990. Those sales consisted largely of timber sales that were made in 1990 pursuant to another congressional rider—called Section 318—but were suspended when the marbled murrelet was listed as an endangered species. The salvage rider also covered additional previously offered sales that remained uncut due to a variety of other reasons, such as threat to fish habitat or timber purchaser bankruptcy. Only timber sale units used for nesting by endangered bird species, for example, marbled murrelets and spotted owls, were exempt from the rider (Anderson 1996).

Administration Response On August 9, 1995, federal environmental and land management agency officials issued a Memorandum of Agreement (MOA) in response to enactment of the salvage rider. The Administration pledged to comply with the requirements of existing environmental laws, including the Standards and Guidelines of the *Northwest Forest Plan*.

Rider Litigation Based on Section 2001(k) of the rider, the timber industry successfully sued to compel the USFS and BLM to release previously suspended or withdrawn timber sales in addition to the Section 318 sales. Judge Michael Hogan narrowly interpreted Section 2001(k)'s exemption for nesting habitat by requiring physical evidence of nesting behavior within specific timber sale units. With respect to new timber sales offered pursuant to the *Northwest Forest Plan*, Judge Hogan ruled that the rider prohibits any legal challenge based on alleged violations of environmental laws. In June, 1996, this decision was reversed by the Ninth Circuit Court of Appeals, but not before some sales were cut under provisions of Section 2001(k).

Public Response The salvage rider and subsequent release of timber sales of ancient forests provoked unprecedented demonstrations and civil disobedience. Hundreds of protesters were arrested at demonstrations in the Siskiyou and Umpua National Forests in southern Oregon and the Olympic National Forest in western Washington. This included 220 people arrested protesting the Sugarloaf and China Left timber sales in the immediate vicinity of the Monument (Noblitt 1996: p.14). The renewed logging of ancient forest and environmental protests attracted extensive regional and national media coverage of the controversy.

Land Use Documents

The land and water resources around Oregon Caves National Monument have been documented recently in many publications. The following publications guide, by regulation or policy, land use decisions on USFS lands surrounding the Monument.

Siskiyou National Forest Land and Resource Management Plan

The *Siskiyou National Forest Land and Resource Management Plan* is the lead USFS document that directs management of the SNF. Published in 1989, it establishes the management direction and associated long-range goals and objectives for the forest for 10 to 15 years. It will be up for revision in the year 2002.

Northwest Forest Plan

The *Siskiyou National Forest Land and Resource Management Plan* was amended with the adoption in May 1994 of the *The Northwest Forest Plan*. The *Northwest Forest Plan* was written to address future management of the Pacific Northwest's federal lands. These federal lands were defined as an area extending primarily on the west side of the Cascade Mountains from Mendocino County, California, north to the Canadian border.

The *Northwest Forest Plan* consists primarily of a set of Standards and Guidelines that govern activities in seven types of management areas. The management areas are: Congressionally Reserved Areas (30%), Late-Successional Reserves (30%), Adaptive Management Areas (6%), Managed Late-Successional Reserves (1%), Administratively Withdrawn Areas (6%), Riparian Reserves (11%), and Matrix (16%).

Designation of LSRs is the method that the *Northwest Forest Plan* proposes to protect old-growth forests. LSRs are large tracts of federal land managed to protect habitat for late-successional (old-growth dependent) species and their respective ecosystems. They provide core habitat for the threatened northern spotted owl and marbled murrelet. Only management activities that "...protect and enhance conditions of late-successional and old-growth forest ecosystems..." would be allowed (The *Northwest Forest Plan*, Standards and Guidelines, p. C-11). After adoption of the *Northwest Forest Plan*, the annual programmed harvest on SNF fell from 160 million to about 27 million board feet. (Cooper 1996, p.46)

Under the *Northwest Forest Plan*, Oregon Caves National Monument is designated as a Congressionally Reserved Area which includes legally designated wilderness areas, wild and scenic river corridors, national recreation areas, national parks, national wildlife refuges, and national monuments. The *Northwest Forest Plan* does not affect the management of these areas.

Since the *Northwest Forest Plan* is an administratively designated plan, it's future and stability as a long-term plan is contingent upon sustaining these policies in future administrations. According the Chief of Planning at the Siskiyou National Forest Supervisor's Office, if the *Northwest Forest Plan* were invalidated, they will continue to manage SNF according to the principles of the *Northwest Forest Plan* until the SNF

LRMP is up for revision in 2002. Planning for the future of the Monument requires an understanding of USFS management policies and how they impact the Monument.

Southwest Oregon Late-Successional Reserve Assessment

The *Northwest Forest Plan* directs the USFS to prepare assessments of LSRs before salvage and thinning operations can occur. The *Southwest Oregon Late-Successional Reserve Assessment* was produced by the Siskiyou National Forest and Medford District, Bureau of Land Management (BLM) in October 1995. It is considered a midlevel assessment for providing information for USFS plan amendments, projects, and restoration and monitoring needs for management of the LSRs. All the LSRs within the SNF are included in this assessment. The Monument is located in the East IV/Williams-Deer LSR.

Before management activities are implemented, all LSR assessments must be reviewed and approved by the Regional Ecosystem Office (REO), in Portland, Oregon. The REO's role is to assist agencies with implementation of the *Northwest Forest Plan*. Members are drawn from eight federal agencies, including the USFS, NPS, United States Environmental Potection Agency (EPA), BLM and the United States Fish and Wildlife Service (USFW). This group determines which projects within the LSRs comply with the *Northwest Forest Plan*. Although the REO has approved the *Southwest Oregon Late-Successional Reserve Assessment*—which means that future silvicultural activities are exempted from project level approval from the REO—there were important exceptions relating to salvage (future salvage activities were not exempt from REO review) , Unique Habitats (activities designed to provide or maintain elk forage in areas which provide or have the potential to provide late successional characteristics are not exempt from REO review), and thinning projects within known spotted owl activity centers.

Grayback/Sucker Pilot Watershed Analysis

The *Northwest Forest Plan* divided all federal lands in the region into Key and Non-key Watersheds. Key Watersheds function as fish habitat refuges and as sources of high water quality, and comprise about one-third of all federal lands in the region. Restrictions are placed on Key Watersheds in two ways: road construction is prohibited in roadless areas located within Key Watersheds and is limited elsewhere in Key Watersheds. Second, a watershed analysis must be preformed prior to management activities unless activities are very minor. Watershed analysis is also a pre-requisite to activities in roadless areas located outside Key Watersheds. In addition, Key Watersheds receive top priority for watershed restoration projects.

The *Grayback/Sucker Pilot Watershed Analysis* was one of 15 Pilot Watershed Analysis Areas resulting from the *Northwest Forest Plan* and was completed in April 1995. The Grayback/Sucker Watershed is in the Illinois River basin, which is part of the larger Rogue River basin in southwestern Oregon. It was selected because it is a Key Watershed, contained a mix of land ownerships and management allocations, is important to Oregon South coast fisheries (Sucker Creek is the principal producer of salmonid fish in the upper Illinois, above Cave Junction), and has the potential for restoration. The assessment was conducted by a team of specialists to evaluate factors such as landslides, road densities and conditions, stream temperatures, large woody debris, and status of fish populations. The Monument is situated in the upper end of this watershed.

Draft Environmental Assessment for the Big Grayback Range Allotment Management Plan Update

This is a draft EA prepared by the SNF. Livestock grazing is prohibited in Botanical Areas except where there is an existing allotment. Bigelow Lakes is the only recommended Botanical Area with an existing grazing allotment (refer to Figure 17, Siskiyou National Forest Management Zones). Though the RRNF manages the grazing allotment, cattle are also allowed on SNF lands surrounding the Monument in the upper

Lake Creek watershed. The Decision Notice has not been signed but is expected to be released in the latter part of 1997.

The Big Grayback Cattle and Horse Allotment straddles the boundary of the Applegate Ranger District of the RRNF (16,898 acres) and the Illinois Valley Ranger District of the SNF (2,812 acres) ten miles south of the Town of Williams, Oregon. The RRNF is responsible for the administration of the allotment and was the lead agency for preparing the EA. The updated plan, the *Big Grayback Range Allotment Management Plan Update*, will guide management of range resources for the next ten years until the year 2005.

Five alternatives were considered and Alternative Three was chosen to be implemented. The objectives of Alternative Three are as follows: to protect the Bigelow Lakes area from grazing impacts, to better control livestock movements from low elevation to mid and high elevation pastures, and to increase forage utilization in the under-utilized lower elevation. Alternative Three proposes to exclude cattle from the Bigelow Lakes by constructing fence enclosures around each lake. The stocking level would remain at 70 head of cattle and the grazing season would remain from June 1 through September 30.

Alternative Three proposes a boundary change which incorporates about 4,530 acres of the SNF that has been used since 1980 under a verbal agreement with the permittee and the USFS (referred to as the Buck Peak-Grayback area). The boundary comes very close to the northeast corner boundary of the Monument and includes Lake Creek and Bigelow Lakes in the allotment. (The western boundary is the ridge between Lake Creek and Panther Creek.) Though Bigelow Lakes would be fenced, there is no provision for protecting Lake Creek. On page 11 of the plan, one of the key issues listed is the fact that ORCA's domestic water intake is located about one-half mile below the lakes on Lake Creek and there exits the potential for grazing impacts to this source. (The potential impacts include both infection of coliform bacteria and cryptosporidium contamination.) The plan also cites that there has been a long-standing problem of cattle impacts to the Bigelow Lakes area in general. While livestock are allowed to graze above the lakes, they are supposed to be prevented from reaching the lakes by a drift fence which has proved ineffective (due to steep topography).

All other alternatives, excluding alternative #1 (No Action), would protect the water supply to the Monument. Alternatives #2 and #4 would fence the border between SNF and RRNF and keep cattle off SNF entirely. Alternative #5 would also be preferred since it eliminates cattle grazing on the Allotment until the next plan update.

Adjacent Land Use

Throughout historic times, several industries within the watershed have made significant contributions to the local economy. Gold mining on Sucker Creek is speculated to have produced millions of dollars during the early gold mining years. The industry experienced several distinct eras, gradually declining in importance, particularly following World War II. Conversely, the timber industry began slowly, mostly in support of the mining industry, providing timber for hydraulic mining ditches, flumes, and cabins. World War II marked the beginning of large scale timber extraction until just a few years ago, when federal timber harvest within northern spotted owl was enjoined. Ranching is also tied to the arrival of miners. It experienced some fluctuation, but has remained relatively stable throughout historic times to the present.

Today, the lands surrounding the Monument are entirely within the SNF and are regulated by the USFS. A discussion of management activities for timber, grazing, mining, recreation and visual resources follows. The IVVC which is situated on NPS land in Cave Junction is subject to the zoning of the City of Cave Junction and is addressed separately.

Timber

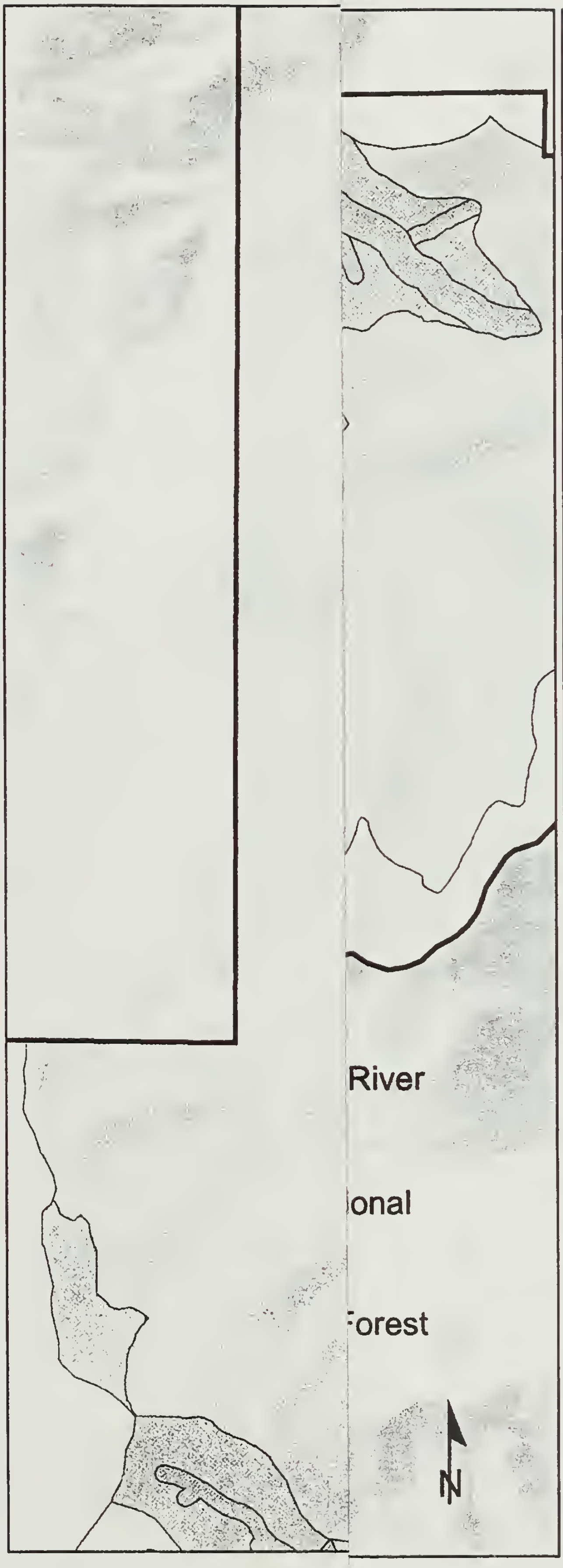
Timber harvesting on lands immediately around the Monument may adversely affect the quality of the visitor's experience. Harvested areas, especially if clearcut, visually detract from the natural setting, and the sounds of cutting and removal of trees are often intrusive. This recently occurred when logging was carried out on unit #2 of the China Left Sale during the peak months of summer visitation in 1997. Sounds of logging operations were clearly evident throughout the main visitor use area, including the Chateau and National Register historic district. Ongoing logging and associated activity could also be directly viewed from the primary visitor areas.

Timber harvesting and road building on steep slopes have recently caused landslides within the region that have the potential to destroy wildlife and fisheries habitat, also potentially putting drinking water at risk. (For example, because of severe flooding in 1996, the City of Salem, Oregon formally asked for a moratorium on federal timber sales in their watershed until a study of the impacts of logging on water quality and flooding has been completed. Oregon Senator Wyden has asked the Administration to provide more protection for municipal drinking water supplies covered under the *Northwest Forest Plan*. Also, a broad coalition of conservation groups have asked for a moratorium on road building and clearcutting of steep slopes on federal, state and private land in the Northwest—to protect residential areas and public highways below the clearcuts.) USFS timber harvesting is occurring, with some harvest areas within one mile of the Monument boundary.

When the SNF LRMP was amended to conform with the *Northwest Forest Plan,* SNF was directed to comply with the more restrictive management areas, and standards and guidelines of the two plans, or the one that provides a greater benefit to late-successional forest-related species. The Monument is surrounded by a LSR designation with the exception of a small finger of land at the southeast corner of Monument which is in a Backcountry Recreation management area. Adjacent to the Backcountry Recreation management area, about one-half mile from the eastern boundary of the Monument is a Botanical area called Bigelow Lakes. (See Figure 17, Siskiyou National Forest Management Zones.) No programmed harvest is allowed inside an LSR, but commercial thinning, salvage logging, and cutting of large trees to reduce fire hazard are permitted under some circumstances. For example, the Standard and Guidelines for Silviculture in LSRs (C-12 and C-13) allows thinning in previously logged and naturally regenerated stands younger than 80 years. Salvage activities are allowed if they would have either a beneficial or neutral effect. LSR's have to maintain a canopy closure of 40% or greater. The LSRs should also have greater than 40 trees per acre.

In 1996, the REO initiated a pilot Implementation Monitoring Program as an important component of the *Northwest Forest Plan*. The purpose was to field test a monitoring program that would determine whether the Record of Decision and its corresponding standards and guidelines were being followed across the region of the *Northwest Forest Plan.* A final draft report was prepared by the Regional Implementation Monitoring Team within the Regional Ecosystem Office. Forty-five timber sales (approximately 10% of the total 424 USFS and BLM timber sales implemented in 1995) were reviewed to evaluate their compliance with the *Northwest Forest Plan*. The draft document, entitled *Results of the FY 1996 (Pilot Year) Implementation Monitoring Program*, states that of the total timber sales that were monitored in 1995, 21.6% of the total timber sale volume was taken from LSRs.

The Backcountry Recreation management area and Botanical area is a more restrictive management category.



ORCA GMP/EIS

FIGURE 17

Siskiyou National Forest Management Zones

Legend

▭ Siskiyou NF Boundary

Management Zone

- □ Backcountry Recreation
- ▨ Botanical Reserve
- □ General Forest (Matrix)
- □ LSR
- □ Partial Retention Visual
- ▨ Private
- ■ Research Natural Area
- □ Riparian Reserves
- □ Special Wildlife Site

0 Kilometers 1
0 Miles 1

Data Sources:
Siskiyou NF: SNF management zones
USGS: topography, park boundary

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SNF Management Zones

ORCA GMP/EIS

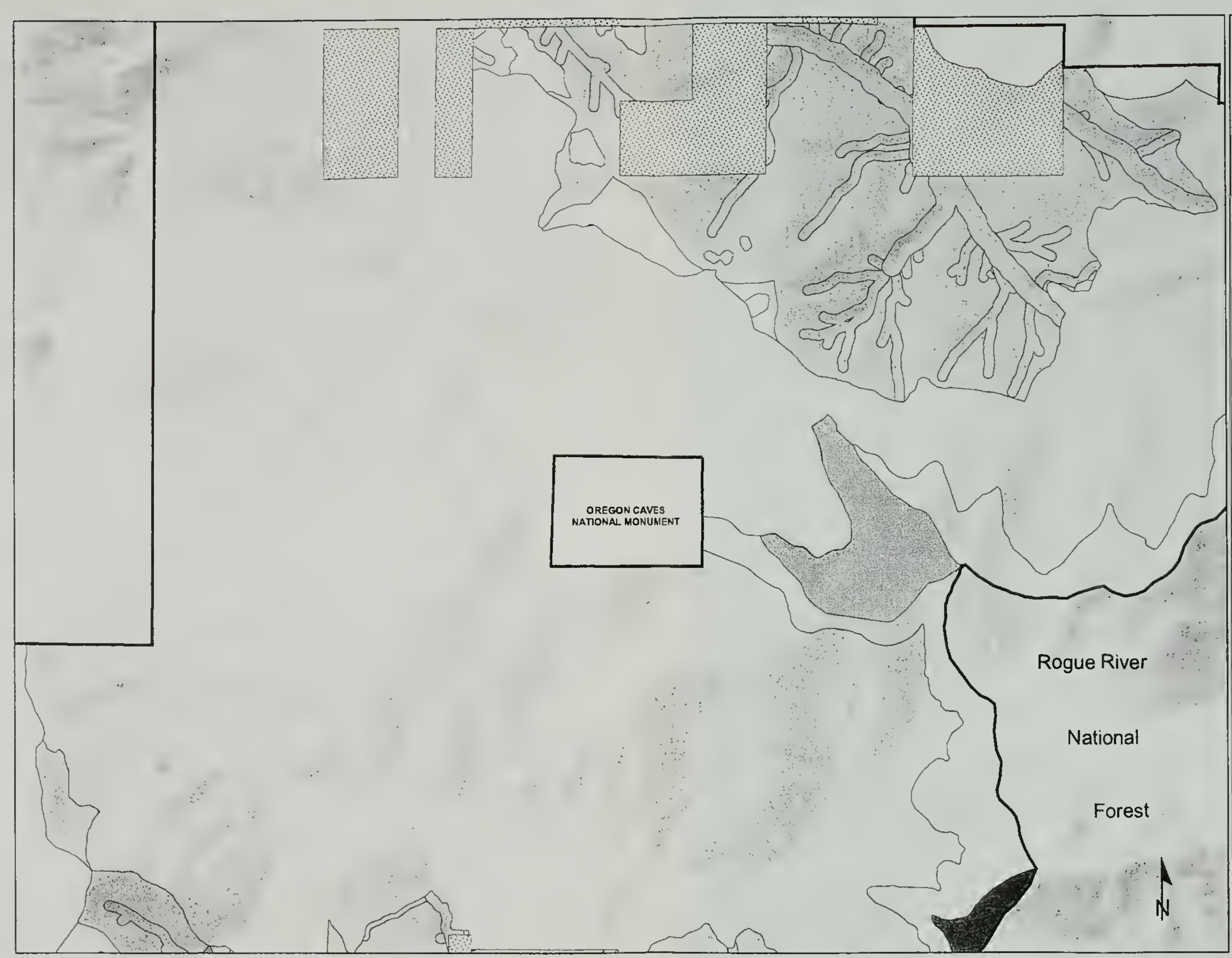

FIGURE 17
Siskiyou National Forest Management Zones

Data Sources:
Siskiyou NF: SNF management zones
USGS: topography, park boundary

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SNF Management Zones

As in LSR's, timber harvest is not programmed. Harvest would be allowed only for hazard elimination or "...capturing losses resulting from catastrophic events."

Though no programmed harvest is allowed in LSR's, cutting has occurred adjacent to the Monument, some sales as a result of a previous salvage rider. During initial public scoping meetings in March 1996 for the general management planning process, timber harvesting, especially clearcutting around the Monument, was identified as a concern by the public to be addressed by the NPS. As shown in Figure 18, Timber Harvest Areas Since 1994, there are four timber sales that have recently occurred within the time frame of this general management planning process, and are planned in an approximate two mile radius around Oregon Caves National Monument. The following information documents the timber sale name, status, and type of cut. Unfortunately, natural or intentional revegetation is difficult due to the high elevations and types of soil. Many older clear cuts in the area, some as old as twenty years, are still highly visible due to unsuccessful revegetation efforts.

Buck Whiskers Timber Sale Buck Whiskers timber sale was sold in March 1994, and has 381 acres of thinning scattered to the west, north, and south of the Monument. Approximately 90% of this sale has been harvested to date. This sale is expected to be completed by the end of 1997. Harvest methods include helicopter, skyline cable logging and horse logging. These existing dense stands of about 100 years of age, will have approximately 40% or less of the canopy removed. According to the USFS, the largest and healthiest trees will be retained. Designed sale units are closest to the Monument, touching the northeast boundary of the Monument and encroaching into the Lake Creek watershed, where the Monument's domestic water intake presently is located. (All units in vicinity of the Monument are completed.)

Buckinghorse Timber Sale This timber harvest was sold in December 1996. Several silviculture prescriptions are planned for this project. Three hundred and thirty-three acres are planned for harvest with 57 acres of regeneration harvest (defined by the USFS as a clearcut or a cut leaving one to several seed trees per acre), 100 acres of selection harvest (partial cut), 13 acres of salvage, and 163 acres of thinning. This project is in Matrix lands in the Grayback Creek area, north of the Monument. About 0.4 miles of new road are planned with this project.

China Left Timber Sale China Left Timber Sale was a Section 318 sale (previous salvage rider sale). It was sold in September 1990 and awarded in 1995. Timber harvest is expected to be completed by the end of 1997. This sale plans to harvest 530 acres, of which 274 acres are clearcut and 256 acres are thinnings. About 2.5 miles of new road construction are planned. The thinning units are close to the Monument and are expected to reduce the present canopy approximately 40%. About 86 acres will be logged by helicopter and 444 acres by skyline cable system.

Sugarloaf Timber Sale Sugarloaf Timber Sale was a Section 318 sale (also a previous salvage rider sale). This timber harvest was sold in September 1990, and harvest was completed in November 1996. According to the USFS, a partial cut of approximately 40% of the multiage stands is necessary to reduce density and improve vigor and health. Helicopter harvest is planned on approximately 670 acres.

Grazing

As mentioned earlier, the only grazing allotment on the SNF is the Big Grayback Allotment. The *Draft Environmental Assessment for the Big Grayback Range Allotment Management Plan Update* proposes a boundary change that incorporates about 4,530 acres of the SNF that has been used since 1980 under a verbal agreement with the permittee and the USFS (Buck Peak-Grayback area). This boundary change incorporates the Lake Creek watershed and Bigelow Lakes in the allotment. One of the key issues stated in the EA is the fact that the Monument's domestic water intake is located about one-half mile below the Bigelow Lakes on Lake Creek. The EA also cites that there has been a long-standing problem of cattle impacts to the Bigelow Lakes area.

These lakes are the most likely brooding site for pacific tree frogs (*Hyla regilla*) which are commonly found in the Monument's serpentine meadows near Bigelow Lakes. The role that these frogs play in the ecology of these meadows and the impacts that grazing have on their reproduction in Bigelow Lakes is a reasonable concern for the Monument.

Recent outbreaks of cryptosporidiosis have been reported as close as Medford, Oregon (refer to Water Use and Treatment section in this chapter). The parasite, *Cryptosporidium parvum*, is spread by mammals, (particularly calves), through fecal contamination into surface waters or runoff from contaminated ground into streams or lakes. According to the USFS, removal of cattle from this watershed might not significantly reduce the likelihood of someone contracting cyrptosporidiosis. However, the drinking water industry promotes a multibarrier approach to the problem which includes protection and control of the watershed (and thereby, the water supply), as the first priority.

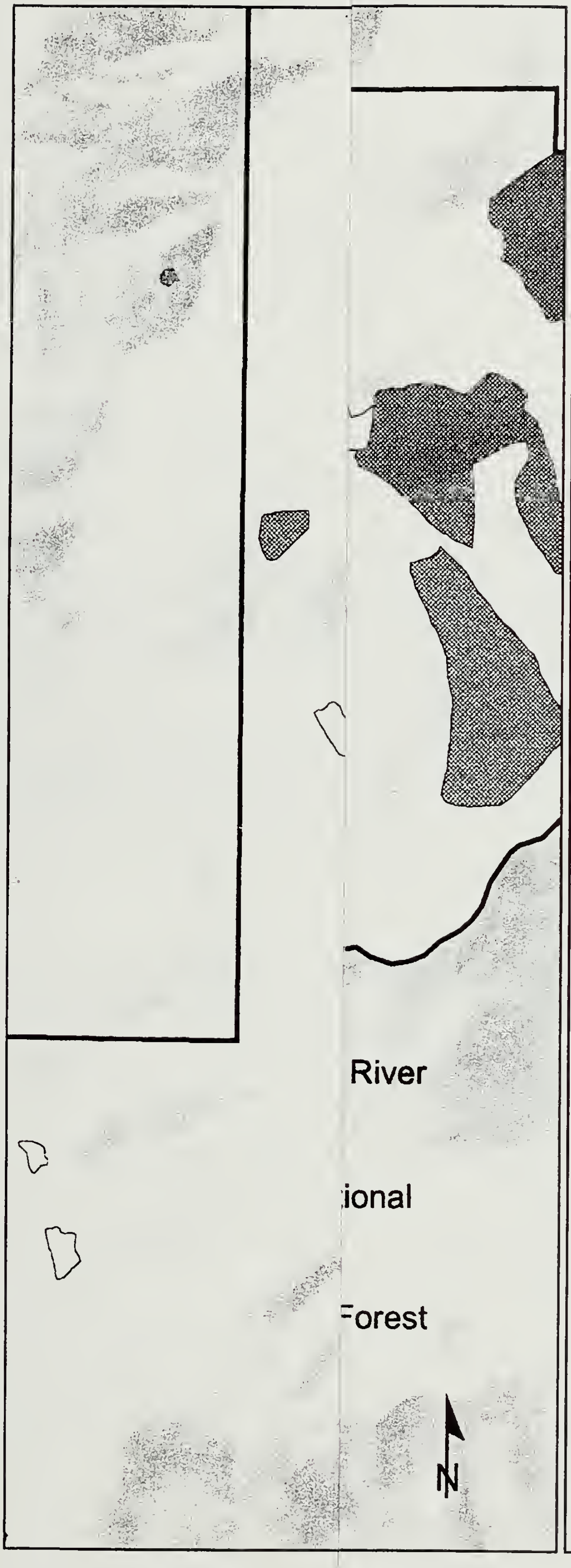
In addition, the Buck Peak-Grayback area is located in a designated LSR and a Key Watershed as defined by the *Northwest Forest Plan*. In general, nonsilvicultural activities such as grazing are allowed within LSRs, provided the activities are neutral or beneficial to the creation and maintenance of late-successional habitat. However, Lake Creek and Bigelow Lakes are also within Riparian Reserves. (Riparian Reserves are defined areas in which the Aquatic Conservation Strategy is implemented. The strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Reserve widths required for such permanently flowing nonfish-bearing streams is 300 feet). The standards and guidelines in the *Northwest Forest Plan* for Riparian Reserves state that grazing practices must be adjusted to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives. If adjusting practices is not effective, then grazing would be eliminated.

The allotment is also within the Bigelow Lakes Botanical management area. The SNF LRMP states that livestock grazing will be prohibited in Botanical Areas, except where the use occurs as part of an existing allotment. Bigelow Lakes is the only existing recommended Botanical Area with a grazing allotment. The SNF LRMP also states that cattle will be prevented from reaching the Lakes area by a drift fence (which no longer exists). The effects of grazing in the Bigelow Lakes basin will be monitored, and corrective action taken as necessary.

Mining

The SNF LRMP states that the primary interests in mineral deposits in the area concentrate on gold, with numerous other minerals represented. Placer dredging is the most common form of mining, with some activity on lode claims. Most of the mining activity is recreational mining involving a floating suction dredge to filter through stream bed material and obtain gold. A number of commercial mining operations use larger mechanized equipment. The type of mining activity ranges from the weekend gold panner to the backhoe operator who may operate the entire season from June 15 through September 15.

Currently, SNF receives about 100 operating plans each year, and a large number of Notices of Intent for



ORCA GMP/EIS

FIGURE 18

Timber Harvest Areas Since 1994

Legend

▭ Park Boundary

▨ Sugar Loaf

▨ China Left

▭ Buck Whiskers

▭ Bucking Horse

No data for Rogue River National Forest
or other adjacent lands

0 Kilometers 1

0 Miles 1

Data Sources:
Siskiyou NF: timber harvest areas,
Siskiyou NF Boundary
USGS: topography, park boundary

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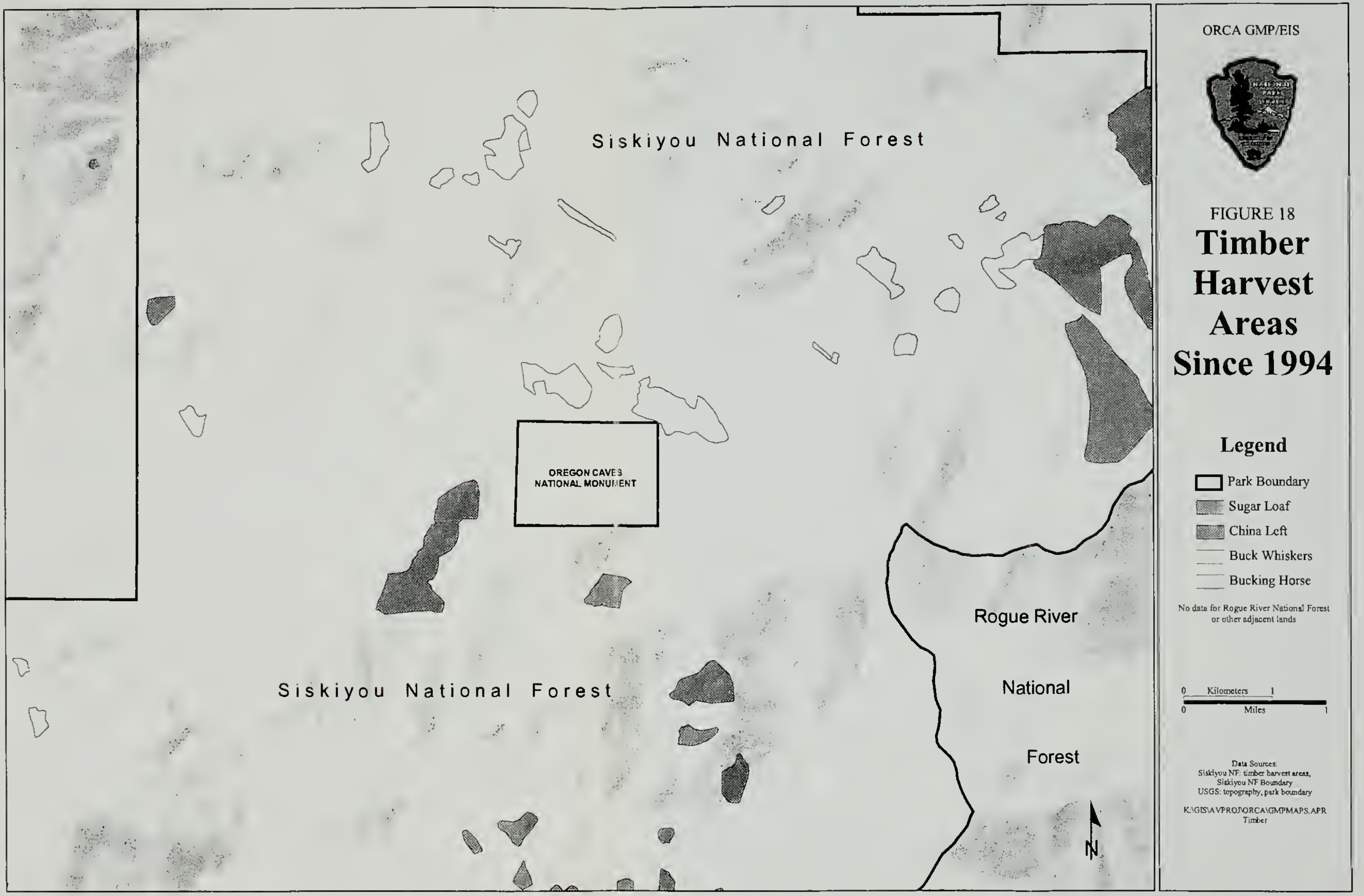
Timber

ORCA GMP/EIS

FIGURE 18

Timber Harvest Areas Since 1994



No data for Rogue River National Forest or other adjacent lands

Data Sources:
Siskiyou NF: timber harvest areas,
Siskiyou NF Boundary
USGS: topography, park boundary

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Timber

small operations. Additionally, SNF is host to numerous unpermitted "recreational miners", who enjoy gold panning or other nondisturbing mining activities.

There are unpatented claims that have never been terminated or validated within a four mile radius of the Monument, particularly small placer operations on Sucker Creek. Since these claims are downsteam from the Monument they probably would not have a direct impact on park operations or visitor use. The 1907 Secretarial withdrawal of Sections 9, 10, 15, and 16 prohibit mining in these lands adjacent to the Monument. (Refer to Figure 2, Withdrawals and Status of Oregon Caves National Monument in Background of the Park chapter.)

Mining in LSRs will be assessed, and mineral activity permits will include appropriate stipulations related to all phases of mineral activity. The guiding principle will be to design mitigation measures that minimize detrimental effects to late-successional habitat (Record of Decision, *Northwest Forest Plan*).

According to the SNF LRMP, in the Botanical management areas, valid mining claims existing prior to botanical area designation may be developed. Every effort should be made to protect botanical resources, especially sensitive plant species. Botanical areas may be recommended for withdrawal from mineral entry in situations where mitigation measures do not adequately protect management area values. The mineral potential of the area shall be assessed before withdrawal is recommended.

The administration of mining activities in Backcountry Recreation management areas will be geared to produce the least impact to the management area values. On-site reviews by the Forest Mining Engineer will be made before authorizing ground-disturbing activities in operating plans. Backcountry Recreation areas may be recommended for withdrawal from mineral entry where mitigation measures do not adequately protect resource values. The mineral potential of the area shall be assessed before withdrawal is recommended (SNF LRMP).

Recreation

The trail system in the watershed is now used primarily for recreation. It evolved from trails built for fire suppression when the SNF was established in 1906. Miles of trail have been replaced by timber access and other roads. Recreational use of the trails has been growing and now constitutes the primary use of the trail system. Recreation occurs throughout the SNF. Discussion is limited to the two management areas surrounding the Monument—the Backcountry Recreation management area and LSR.

The Backcountry Recreation management area in the SNF LRMP provides a recreation setting appropriate for semi-private, motorized recreation use. Backcountry Recreation is a more restrictive management category than LSR. Recreational use will be relatively light so that users will meet infrequently. The only facilities will be trails, primitive camps and relatively inconspicuous facilities needed for wildlife or fish habitat improvement.

The Backcountry Recreation area adjacent to the Monument is named High Divide and is a motorized area. "Motorized Backcountry areas will also have primitive roads used as off-road vehicles (ORV) and jeep trails, and may have roads used for mining, or to cross to management areas with timber harvest. Human activities do not interfere with natural processes involving the development of vegetation communities and the interactions of wildlife and habitat. (SNF LRMP)"

Recreational uses (dispersed and developed recreation) in LSRs are allowable as long as the practices do not retard or prevent attainment of LSR objectives. In Riparian Reserves in LSRs, new recreational facilities, and dispersed and developed recreation practices are allowable if they do not prevent meeting Aquatic Conservation Strategy objectives.

Visual Resources

The SNF is known for its spectacular scenery and views. The Monument is mentioned as one of seven high priority viewsheds in the SNF LRMP. Because Caves Highway (State Route 46) is a heavily used recreation travel corridor, it has been placed in a Retention Visual area. (State Route 46 is listed as a Scenic Historic Road under the Oregon Scenic Historic Road Act.) This USFS management area emphasizes scenic quality over timber production. Management activities, including timber harvest, would be designed to not be visually evident to the casual forest visitor. The primary goal is to provide a level of attractive scenery by maintaining the area in a natural or near natural condition.

Partially surrounding this area is another management area labeled Partial Retention Visual. It consists of land that is visible in the middleground to background of major and secondary travel routes, rivers, and other high use recreation areas. According to the LRMP, these areas are managed for multiple uses including recreation, timber production, and wildlife habitat. The priority is "...emphasis on the maintenance of scenic quality." There is a minor reduction in timber production to allow for accomplishing these objectives. Management activities are evident, but are designed to be visually subordinate to the characteristic landscape.

The *Grayback/Sucker Pilot Watershed Analysis* mentions the importance of viewshed in relationship to the Monument. The watershed analysis resulted in a set of management recommendations for the watershed based on key findings. One recommendation states that the Monument's viewshed is in a heavily altered condition, and does not meet SNF LRMP guidelines. They set as an objective the desire to meet SNF LRMP visual guidelines with the priority locations within the "...Oregon Caves Viewshed, and along Caves Highway and Grayback Road." As a treatment option, the recommendation further states mitigating past scenic degradation in future project design. The analysis also mentions existing scenery degradation resulting from timber cutting, stating that the acceptable thresholds for impacts to the scenery (as set in the SNF LRMP) were exceeded in the Grayback, Oregon Caves, and Horse Mountain Viewsheds. The analysis also states that "...future timber harvest will likely impact the surrounding scenery of the Monument".

Recreational Resources

Historic Overview

Historically, the Grayback/Sucker watershed has been the most important watershed on the SNF for recreational use for dispersed (scattered, undeveloped areas) and developed (established facilities) recreation sites (*Grayback/Sucker Pilot Watershed Analysis* 1995: p.1). It began with use by local residents who traveled by horse or foot to the high lakes during the hot summer months and increased with the discovery of the Oregon Caves National Monument. Later, recreational demand shifted from dispersed campsites to developed campsites. Presently, the watershed has the highest use of, and demand for, developed campgrounds and facilities within the SNF. Most recreational use occurs along watercourses.

Within the Monument, summer recreational use by visitors is touring the caves, picnicking, and hiking.

Winter recreational sports include cross country skiing, and snowshoeing. The overall use of the Monument during the winter appears to be increasing.

Trails

Loop trails originating within the Monument cross into USFS lands and back into the Monument on the west (No Name Trail) and north (Big Tree Trail). Boundary Trail, a USFS trail from Mt. Elijah (Lake Mountain Trail) and Bigelow Lakes, enters the Monument on the southeast side and connects with the Big Tree Trail. The Boundary Trail also accesses the Red Buttes Wilderness Area to the south which contains a portion of the Pacific Crest National Scenic Trail. Thus, Oregon Caves National Monument is linked by trails to 24 other national forests, six national parks, one other national monument, three states and the countries of Canada and Mexico.

Within the Monument, these trails are used for day-use hiking only. Occasionally, nature walks are provided on Big Tree trail by NPS rangers. Horseback riding is not allowed because of the potential spread of exotic plants (seeds carried on the hooves of horses) into the Monument and the spread of Port Orford cedar root rot. Also, the trails are not all designed for horseback riding use. In winter, the Caves Highway is plowed and there is snowshoeing, cross-country skiing, and some snow-play use. (For more information on trails, refer to Existing Park Development and Programs section in this chapter.)

According to the USFS, there are two horse trails in the area around Bigelow Lakes/Mt. Elijah. Trail 1214 (Mountain Meadow) is a horse/foot trail that takes off from USFS Road 070 just before it gets to lower Bigelow Lake. Trail 1206 is an unnamed horse trail that takes off from the end of USFS Road 070 and connects with the Lake Mountain Trail that runs from Mt. Elijah to the Monument. The USFS issues a permit for guided horseback rides on these trails.

Picnic Areas

There are two designated picnic areas at the Monument. (Refer to Existing Park Development and Programs.) Two picnic tables are provided for public use at the IVVC in Cave Junction.

Campgrounds

There are no campgrounds at the Monument. Two USFS campgrounds are located on State Route 46 from Cave Junction leading to the Monument. Grayback Creek Campground is a 35 site facility and day-use area located eight miles from the Monument. It has an outdoor amphitheater used by NPS staff for interpretive programs during summer months. Cave Creek Campground, four miles from the Monument provides 18 primitive sites and a trail link to the Monument. The campgrounds are utilized throughout the summer and they receive a light to moderate level of use the majority of the time. Day use at the campgrounds is also moderate. Though on USFS land, both campgrounds are operated by the private company that also has the concession contract at the Monument. Activities include wildlife and botanic viewing, observing spawning, salmon and steelhead fishing and swimming.

There are several privately owned campgrounds in the Cave Junction area offering a variety of services. A new 50 site campground has been planned for the Illinois River State Park in Cave Junction.

Scenic Resources

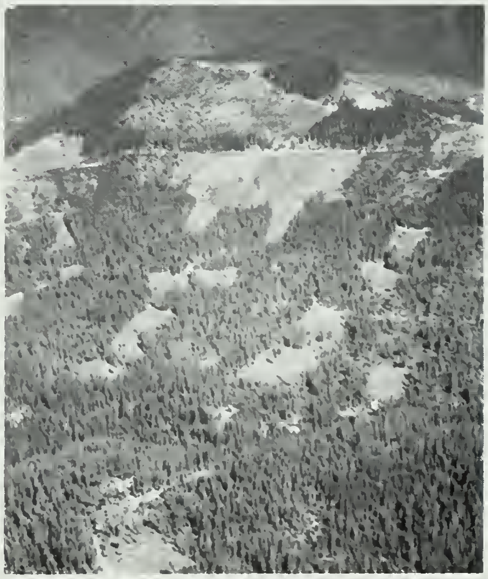
Scenically the region is outstanding, differing from the Sierra, the Rockies and the Cascades. Steep slopes, narrow canyon bottoms, and incised streams are the visible products of glacial processes. Port Orford cedars, rhododendrons, Douglas fir, white pine, sugar pine and incense cedars are abundant and once covered many hundreds of thousands of acres of this part of western Oregon. More recently, urban development, and past management practices such as logging, have impacted the natural scenery.

Oregon Caves Highway (State Route 46) is the main access and travel route to the Monument. It is listed as a Scenic Historic Road under the Oregon Scenic Historic Road Act. (The designated section of Oregon Caves Highway, State Route 46, is between mileposts 8.01 and 19.51—a total of 11.5 miles. The first eight miles from the IVVC are not designated.) This portion of road was completed in 1922 to provide better access for tourists to Oregon Caves National Monument. The scenery along Caves Highway can best be described as a rural landscape incorporating small farmsteads, some scattered small businesses and residential use. Entering the SNF, the scenery abruptly changes to an enclosed canopy of evergreen trees. The sharply winding road hugs the natural contours of the land producing a slow but enjoyable ride. The integrity of the highway should be maintained by retaining the existing alignment (Oregon Department of Transportation, no date: p.28). (See Figure 19, Oregon Caves National Monument Visitor Experience.)

The Oregon Department of Transportation has nine preservation directives for designated Historic and Scenic Roads. These directives relate to the following: 1) preserving features that have historical, scenic, recreational significance, 2) consulting with the SHPO and state historic organizations about how to best rehabilitate, restore, maintain and preserve significant features of the highway or structures, 3) posting of information signs 4) and considering aesthetics and environmental effects when the only alternative is to replace a portion of highway or related structure.

Though still on the books, the Oregon Scenic Historic Road Act is inactive and is presently being replaced by the Scenic Byways Program. Proposals to classify portions of roads as scenic byways must come from citizens, or interested agencies. The benefits of the program include: signage to and along the route paid for by Oregon Department of Transportation (ODOT); incorporation in an Oregon state map for marketing and promotion; and inclusion in a scenic byways publication for marketing and tourism efforts. Caves Highway has not been designated under this new program.

As mentioned in the Visual Resources subsection, the USFS has designated the forest along Caves Highway as a Retention Visual area which emphasizes scenic quality over timber production. Though timber harvest is limited along Caves Highway there are several places where nearby clearcuts can be seen. One particular cut is viewed from the shared SNF and NPS boundary along Caves Highway. Another clearcut, which has been revegetated many times over the years is viewed from the Monument's main parking lot. The visitor may not be aware of how widespread



1995 aerial view looking north to Buck Peak. Monument is at bottom center of photo.

FIGURE 19

Oregon Caves Highway
Visitor Experience

Oregon Caves Highway Visitor Experience

Oregon Caves Highway (State Route 46) is a 20 mile highway linking the city of Cave Junction with Oregon Caves National Monument. Due to its natural scenic beauty, a portion of the road was designated a state Scenic Historic Road. The Illinois Valley Visitor Center (IVVC) located in Cave Junction on Oregon Caves Highway marks the beginning of the visitor's journey to the Monument and is an important part of the total visitor experience. Here, visitors receive information about the Monument and may purchase cave tour tickets.

1 As the visitor departs Cave Junction, development patterns change. Houses are generally set back from the road, in among the woods, and gradually spaced further apart. There is a sense of enclosure on this part of the drive.

2 Just before the western junction with Holland Loop, the vegetation opens up and views are across pastures and fields toward the mountains beyond. The visitor has a choice of continuing along Caves Highway or detouring south along Holland Loop, a six mile scenic route which travels through farmlands, past two wineries and across Sucker Creek twice, before it rejoins with Caves Highway further east. On this section of the drive several clearcuts are visible on the hills to the south.

3 Beyond the eastern junction of Holland Loop and Oregon Caves Highway, the land rises in gentle hills and the vegetation creates a feeling of enclosure. The forest along the drive consists principally of Ponderosa pine, Douglas fir, alder, big-leaf maple, madrone, oak and dogwood. There are fewer residences along the road beyond this point.

4 At the ten mile milepost, the visitor has a clear view of Sucker Creek which the road follows for the next several miles. After entering Siskiyou National Forest, the topography steepens. Grayback Campground is encountered just before the junction of Grayback and Sucker creeks on the right side of the road as the visitor continues toward the Monument. The NPS holds interpretive talks there on summer evenings.

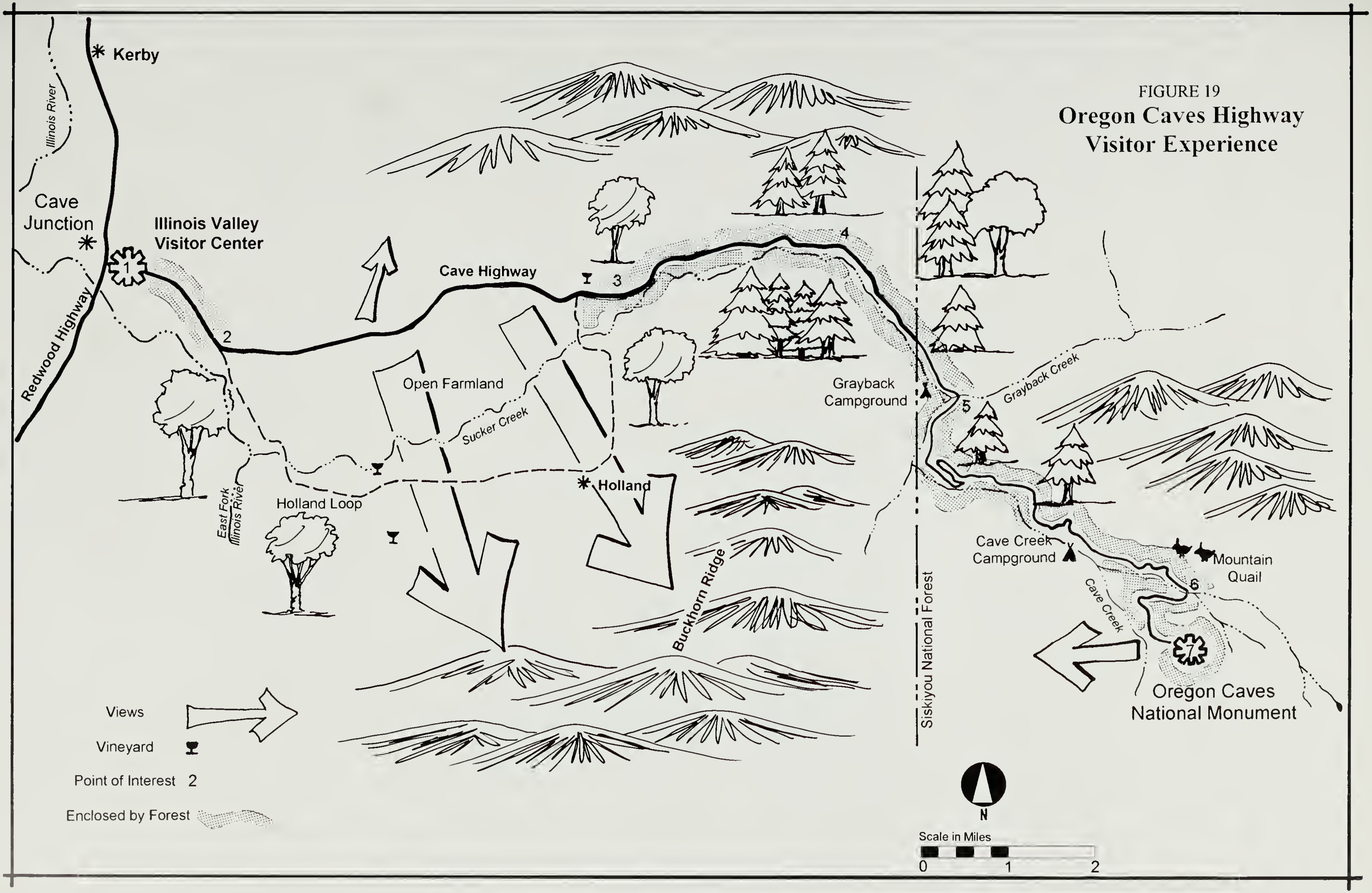
5 After crossing Grayback Creek, the character of the road changes, becoming narrower and steeper as it winds its way up the mountain through mixed conifer and broadleaf forest. There are large Ponderosa pines, Douglar firs, and Port Orford cedars along the road as you near the Monument. If visitors are lucky, they can spot mountain quail in the forest, near the small streams. Occasionally, clearcuts are noticeable on the mountain across the valley through brief openings in trees lining the road. Cave Creek Campground is the last campground before the Monument boundary. Visitors can hike the one and one-half miles to the Monument from the campground on Cave Creek Trail.

6 One mile before the Monument boundary, the visitor crosses a bridge over Lake Creek, and continues on the winding road up the mountain to the Oregon Caves National Monument sign. Just a few hundred feet beyond the sign is the main parking lot. Located here are public restrooms in the historic Checking and Comfort Station. There are interpretive exhibits, an upper and lower picnic area, and a trail head for No Name Trail.

7 Once the car is parked, the visitor walks along a 900 foot long access road to heart of the historic district encompassing the Checking and Comfort Station, Chateau, Chalet, Guide Dormitory, Ranger Residence, and the cave entrance. The road is level and there are excellent examples of marble formations to the side of the road. The visitor is ready to begin exploring the Monument. Visitors can also use the Monument to explore the surrounding region, as the Monument trails connect to a regional network which can take them to Red Buttes Wilderness or the Pacific Crest Trail. Linkages to the Pacific trail not only makes the Monument accessible to trail users, it connects Oregon Caves National Monument to 24 other national forests, six national parks, one other national monument, and parts of three states from the Canadian and Mexican border.

FIGURE 19

Oregon Caves Highway Visitor Experience



logging activities are, but viewed from the air, the clearings can be seen around the Monument.

Visual Analysis

During the public scoping period, clearcutting occurring around the Monument on USFS lands was defined as an issue to be addressed. A visual analysis was begun by the planning team in the fall of 1996. The purpose of this analysis was to define and document the views most important to visitor experience. This visual analysis was used to support development of alternatives in the Alternatives chapter. It also provides the Monument with a planning tool to help minimize visual impacts that are seen by visitors within important viewsheds, and an opportunity for further dialogue with SNF staff regarding additional mitigation measures which might be taken.

Viewpoints

Several viewpoints were selected by the planning team where the park visitor would most often view the surrounding scenery. These points included the cave entrance, cave exit, the main parking lot, and popular spots along trails. Readings at each viewpoint were taken from a Global Positioning System receiver and used to pinpoint the exact horizontal location (longitude and latitude). In a few cases, the viewpoints were selected by digitizing a point in the Geographic Information System (GIS), using a digital elevation model as a backdrop. This information was then entered into the NPS GIS. Using a digital elevation model (grid of elevations), these points were used to generate individual and composite viewsheds of the surrounding landscape. The elevation grid points were based 30 meters apart.

It is important to note that the computer-generated viewshed for each point is based upon landform and not vegetation. Though any future changes to the landform would probably be minor, fire or logging activities could remove existing vegetation. Also, vegetation removed closer to the viewer (viewpoint) would possibly have more visual impact than vegetation removed within the corresponding viewshed.

After the viewpoints were chosen, they were ranked into two sensitivity levels—Level I representing six viewpoints in close proximity to Oregon Caves and Level II representing six additional viewpoints further from the cave along trails on both USFS and Monument lands. The Level I viewsheds are visually more sensitive and have a greater need for protection than the Level II viewsheds because the views are seen by more visitors and therefore are considered to have a greater impact on visitor experience. (See Figure 20, Viewpoints: Level I and Level II.)

Level I Sensitivity

Level I included six viewpoints:
Viewpoint 1 - The main parking lot (views to west, southwest) (See Figure 21,Viewshed 1.)
Viewpoint 2 - The cave entrance (views to west over Chateau) (See Figure 22, Viewshed 2.)
Viewpoint 3 - The cave exit (views to northwest) (See Figure 23, Viewshed 3.)
Viewpoint 4 - Along the Cliff Nature Trail (views to northwest) (See Figure 24, Viewshed 4.)
Viewpoint 5 - Along the Cliff Nature Trail (views to north) (See Figure 25, Viewshed 5.)
Viewpoint 6 - Above the Guide Dormitory at beginning of Big Tree Trail (views to northwest) (See Figure 26, Viewshed 6.)

Level II Sensitivity

Level II included six viewpoints:

Viewpoint 7 - Along Big Tree Trail on USFS land (views to northeast)(See Figure 27, Viewsheds 7.)
Viewpoint 8 - At Big Tree along Big Tree Trail (views to north) (See Figure 28, Viewshed 8.)
Viewpoint 9 - Along Big Tree Trail (open meadow on serpentine soils, views to northeast) (See Figure 29, Viewshed 9.)
Viewpoint 10 - Along the Connecting Trail between Big Tree and Limestone Trail (views to northeast) (See Figure 30, Viewshed 10.)
Viewpoint 11 - Along Limestone Trail (11a: views to north, northeast and 11b: views to south, southeast) (See Figure 31, Viewshed 11a and Figure 32, Viewshed 11b.)
Viewpoint 12 - Lake Mountain summit (See Figure 33, Viewshed 12.)

Distance Zones

The viewshed was divided into two distance zones—foreground, and middleground. Background views were not considered because, though important, they have the least impact on visitor experience and can extend many miles into the distance, well beyond acreage controlled by either NPS or USFS. Distance zones are divisions of a particular landscape being viewed. They are used to describe the part of a characteristic landscape that is being evaluated. The planning team used the distance zones as defined in the 1974 USFS document, *National Forest Landscape Management, Volume 2*, Chapter 1, The Visual Management System, and information from the new updated handbook, *Landscape Aesthetics, A Handbook for Scenery Management* (Agricultural Handbook 701).

Foreground

The limit of this zone is based upon distances at which details can be perceived. Normally, in foreground views, the individual boughs of trees form texture. It will usually be limited to areas within one-half mile of the observer, but must be determined on a case-by-case basis.

Middleground

This zone extends from the foreground zone to three to five miles from the observer. Texture normally is characterized by the masses of trees in stands of uniform tree cover. Individual tree forms are usually only discernible in very open or sparse stands. For the purposes of this study, an average of four miles were chosen as the maximum middleground zone extent.

Background

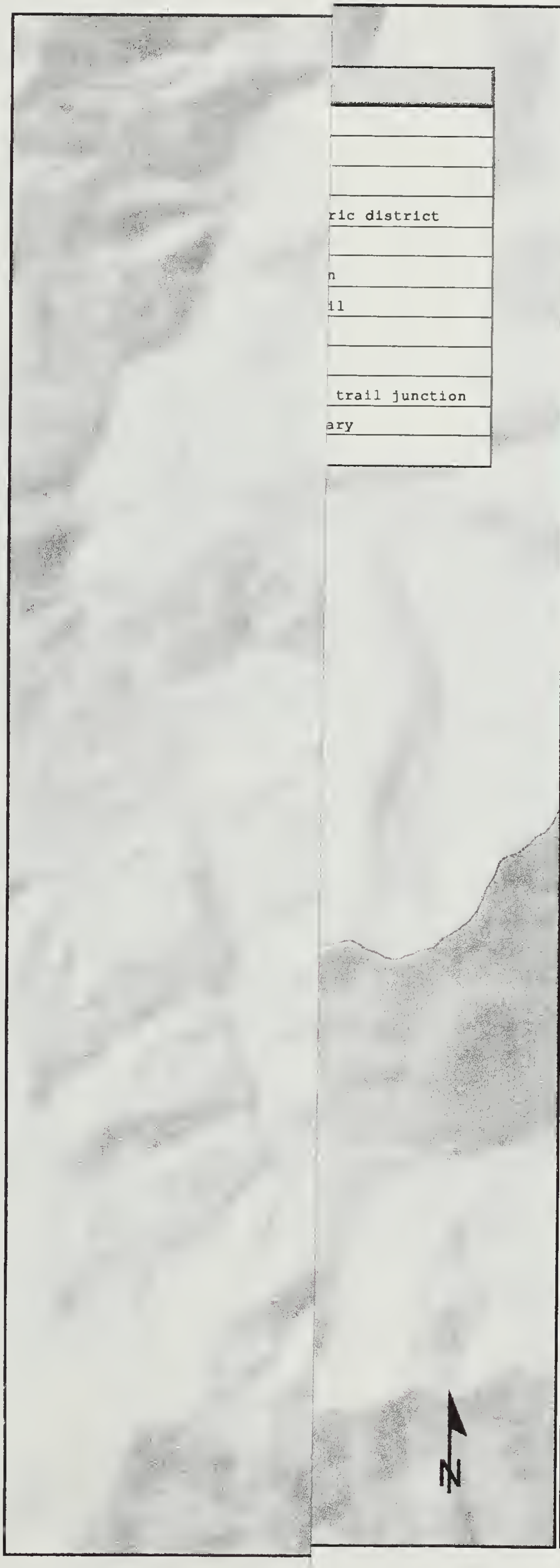
This zone extends from outer edge of the middleground to infinity. Texture in stands of uniform tree cover is generally very weak or non-existent. In very open or sparse timber stands, texture is seen as groups or patterns of trees. (This zone was not dipicted on the maps in the viewshed analysis.)

Composite Viewsheds

A composite viewshed is the combination of several individual viewsheds. For the purposes of this study, four composite viewsheds were produced—Level I Sensitivity viewpoints showing foreground views, Level I Sensitivity viewpoints delineating middleground views, Level II Sensitivity viewpoints showing foreground views, and Level II Sensitivity viewpoints showing middleground views (see Figures 34 - 37, showing composite viewsheds). The composite viewshed for Level I Sensitivity - Foreground views is considered the most visually sensitive of the four composite viewsheds. However, management practices occurring in any of the defined viewsheds should be designed to reduce the visual impacts for the Monument visitor.

ORCA GMP/EIS

FIGURE 20
Viewpoints: Level I & II



Legend

■ Level I Viewpoints

▲ Level II Viewpoints

▭ Park Boundary

/\/ Trails

0 Kilometers 1

0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: level I & II viewpoints
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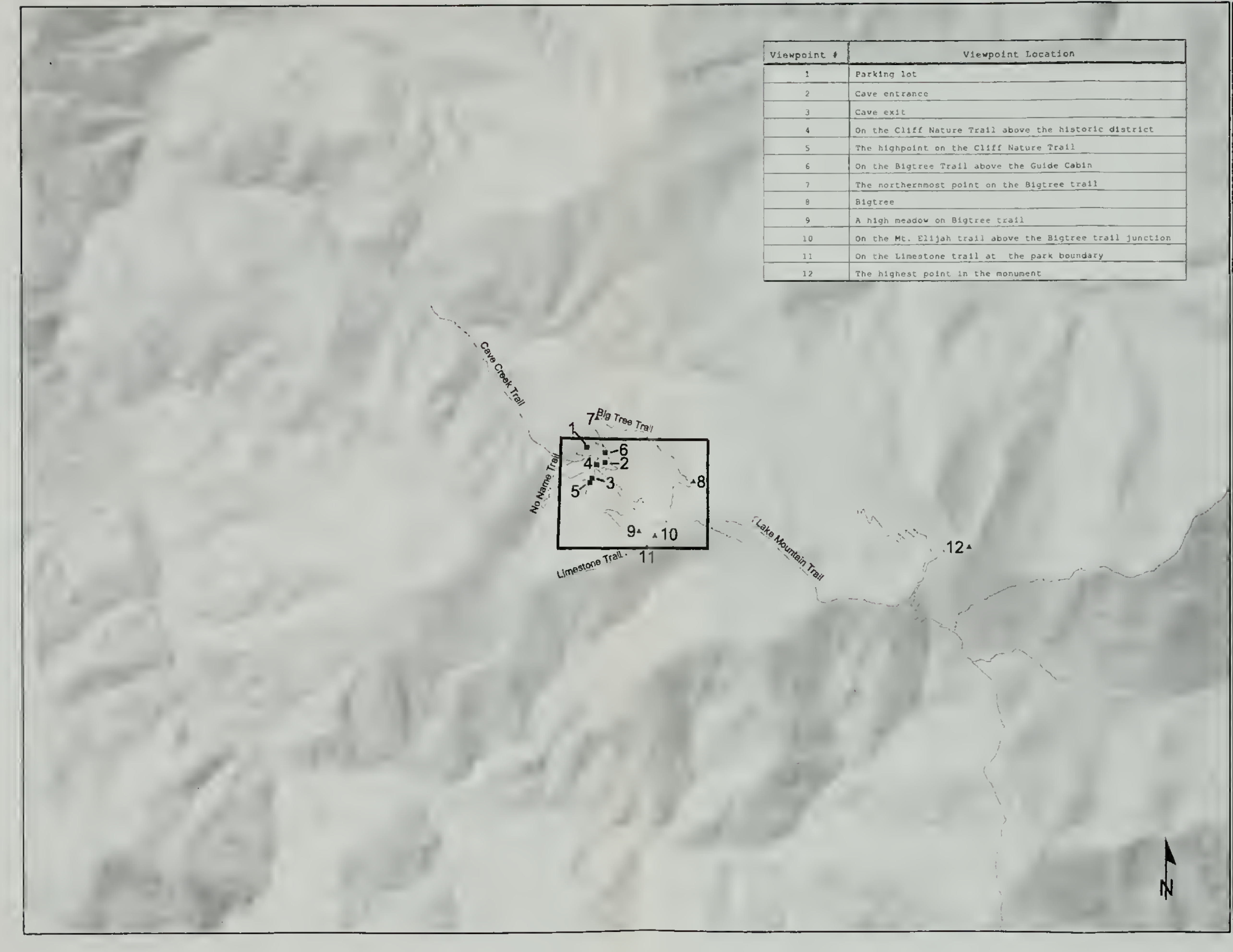
Viewpoints



Viewpoint #	Viewpoint Location
1	Parking lot
2	Cave entrance
3	Cave exit
4	On the Cliff Nature Trail above the historic district
5	The highpoint on the Cliff Nature Trail
6	On the Bigtree Trail above the Guide Cabin
7	The northernmost point on the Bigtree trail
8	Bigtree
9	A high meadow on Bigtree trail
10	On the Mt. Elijah trail above the Bigtree trail junction
11	On the Limestone trail at the park boundary
12	The highest point in the monument

ORCA GMP/EIS

FIGURE 20

Viewpoints: Level I & II

Legend

■ Level I Viewpoints

▲ Level II Viewpoints

▭ Park Boundary

Trails

0 Kilometers 1
0 Miles 1

Data Sources.
USGS: topography, park boundary
NPS: level I & II viewpoints
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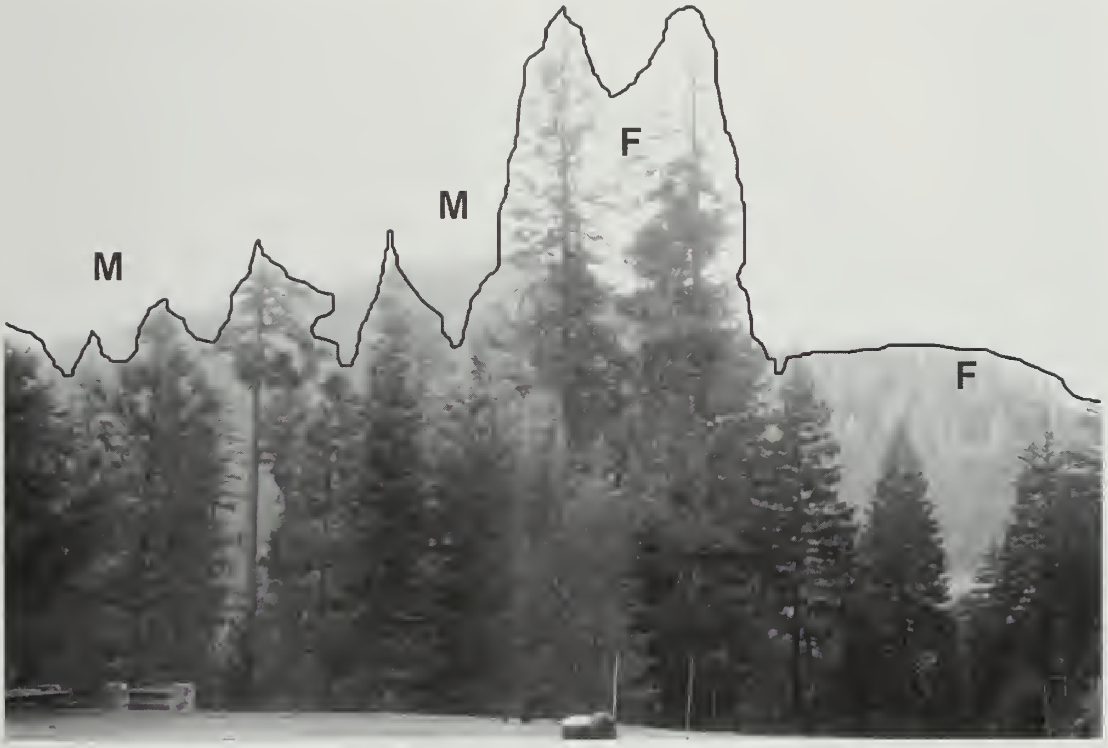
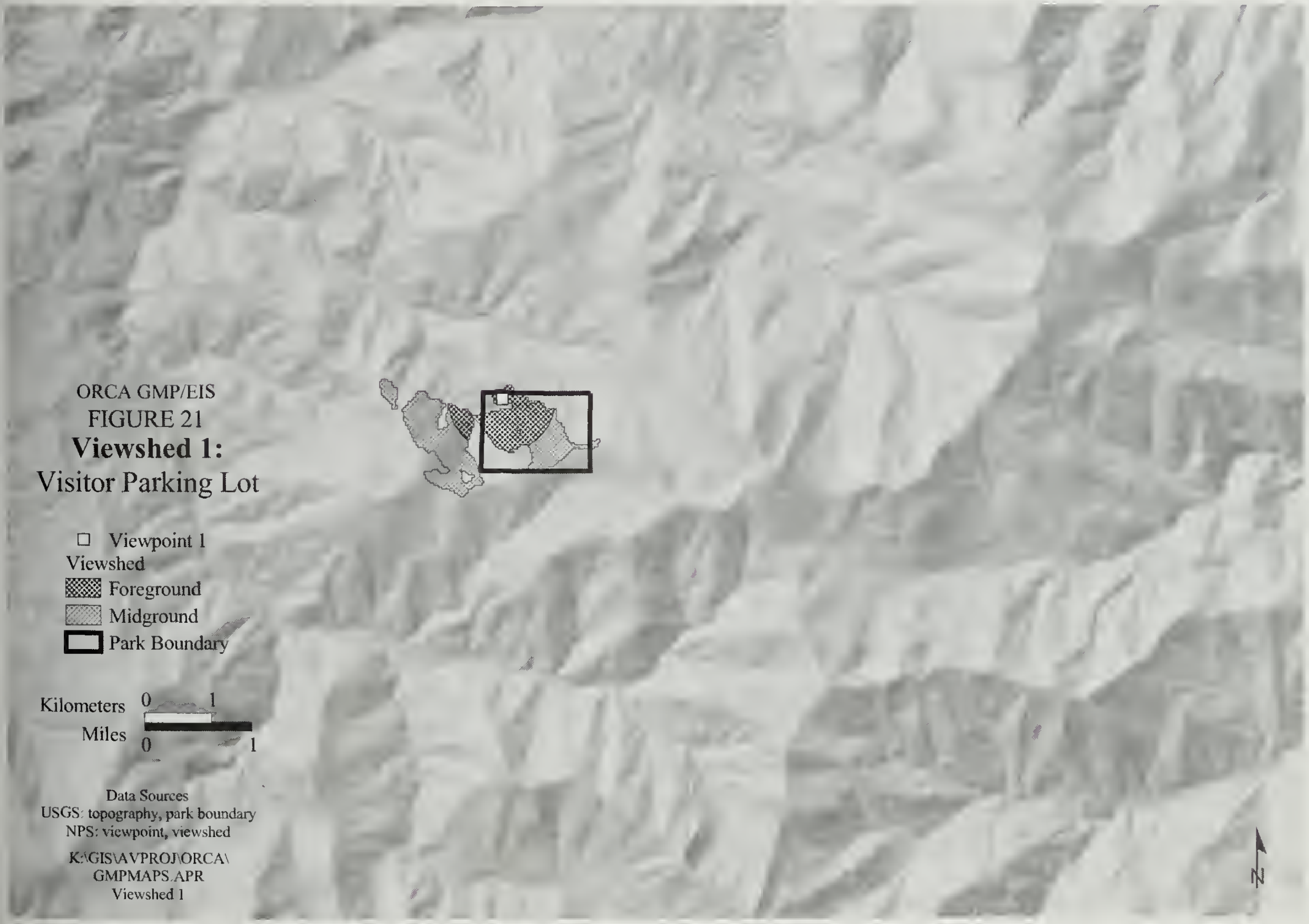
Viewpoints



View from the Visitor Parking Lot Looking West, Southwest



ORCA GMP/EIS
FIGURE 21
Viewshed 1:
Visitor Parking Lot

□ Viewpoint 1
Viewshed
▨ Foreground
░ Midground
□ Park Boundary

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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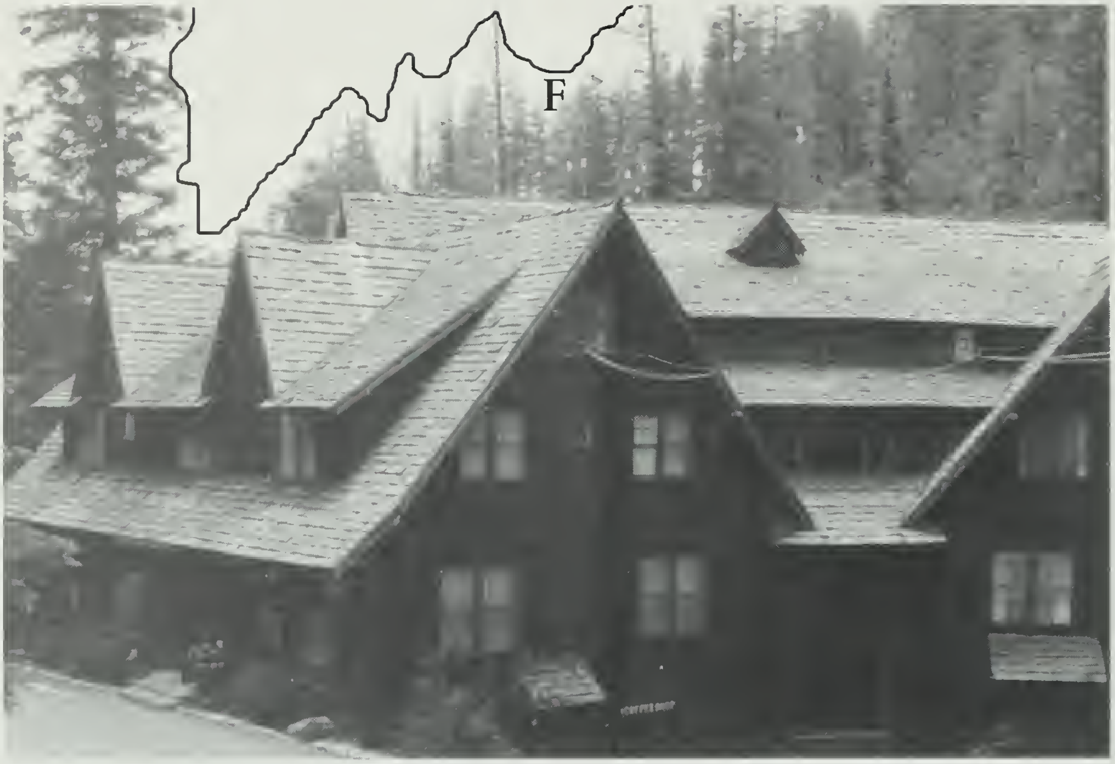
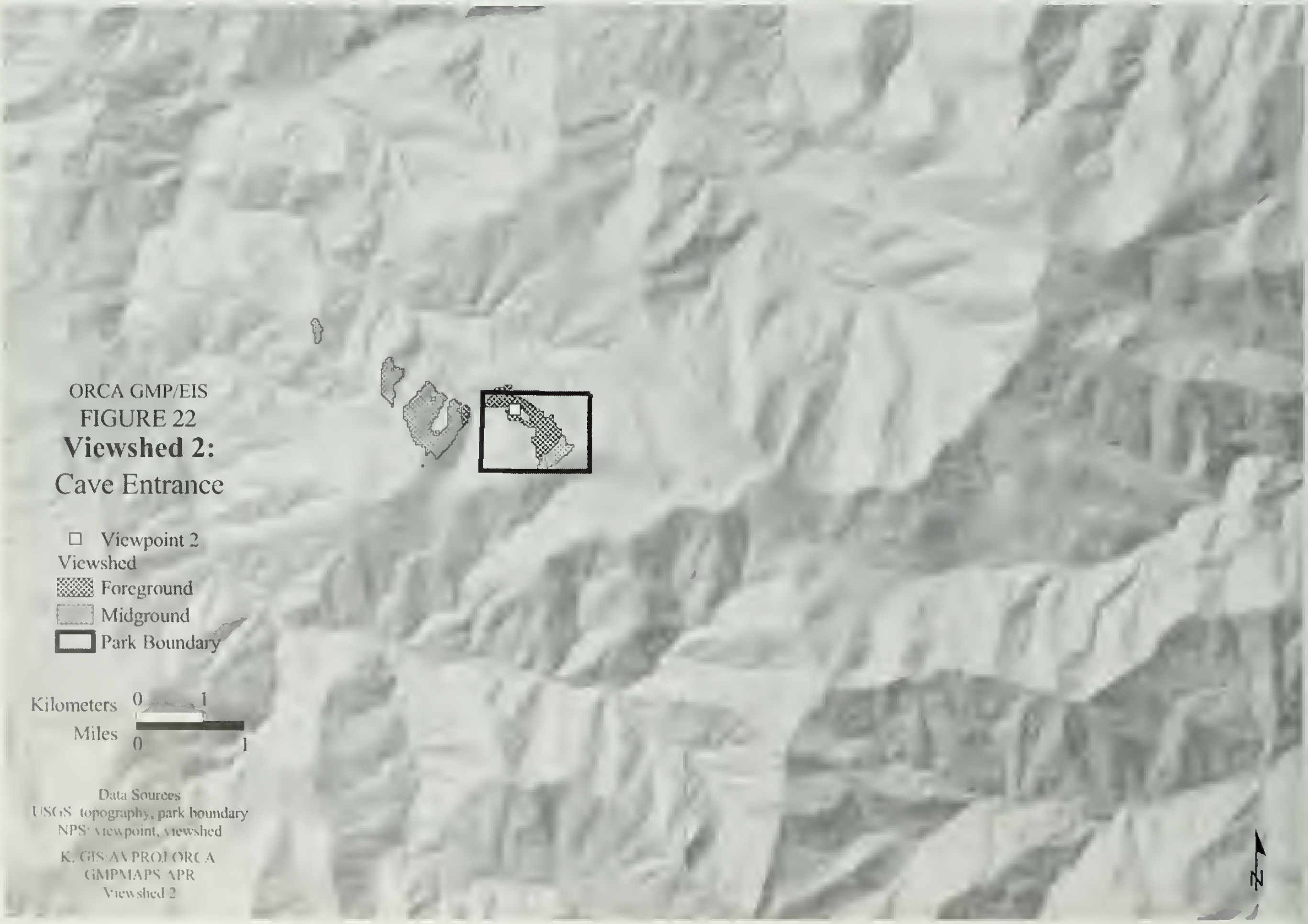
GMPMAPS.APR
Viewshed 1



View from the Cave Entrance Looking West over the Chateau


ORCA GMP/EIS
FIGURE 22
Viewshed 2:
Cave Entrance

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed
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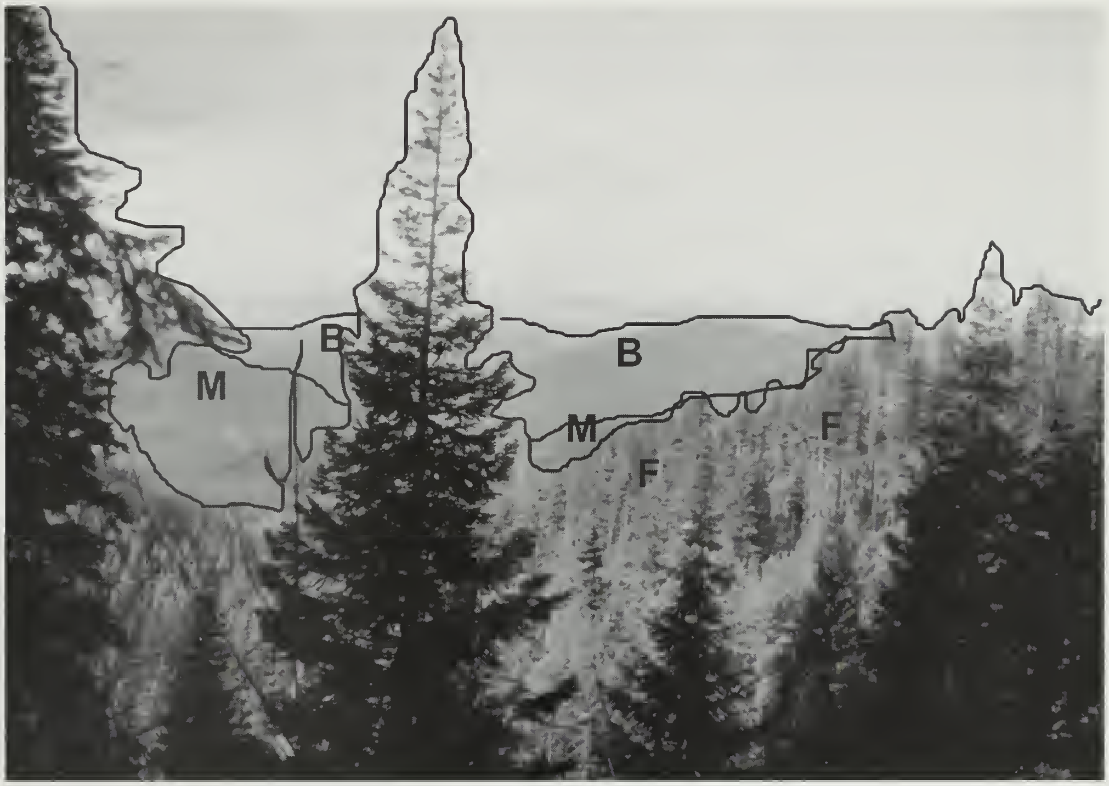
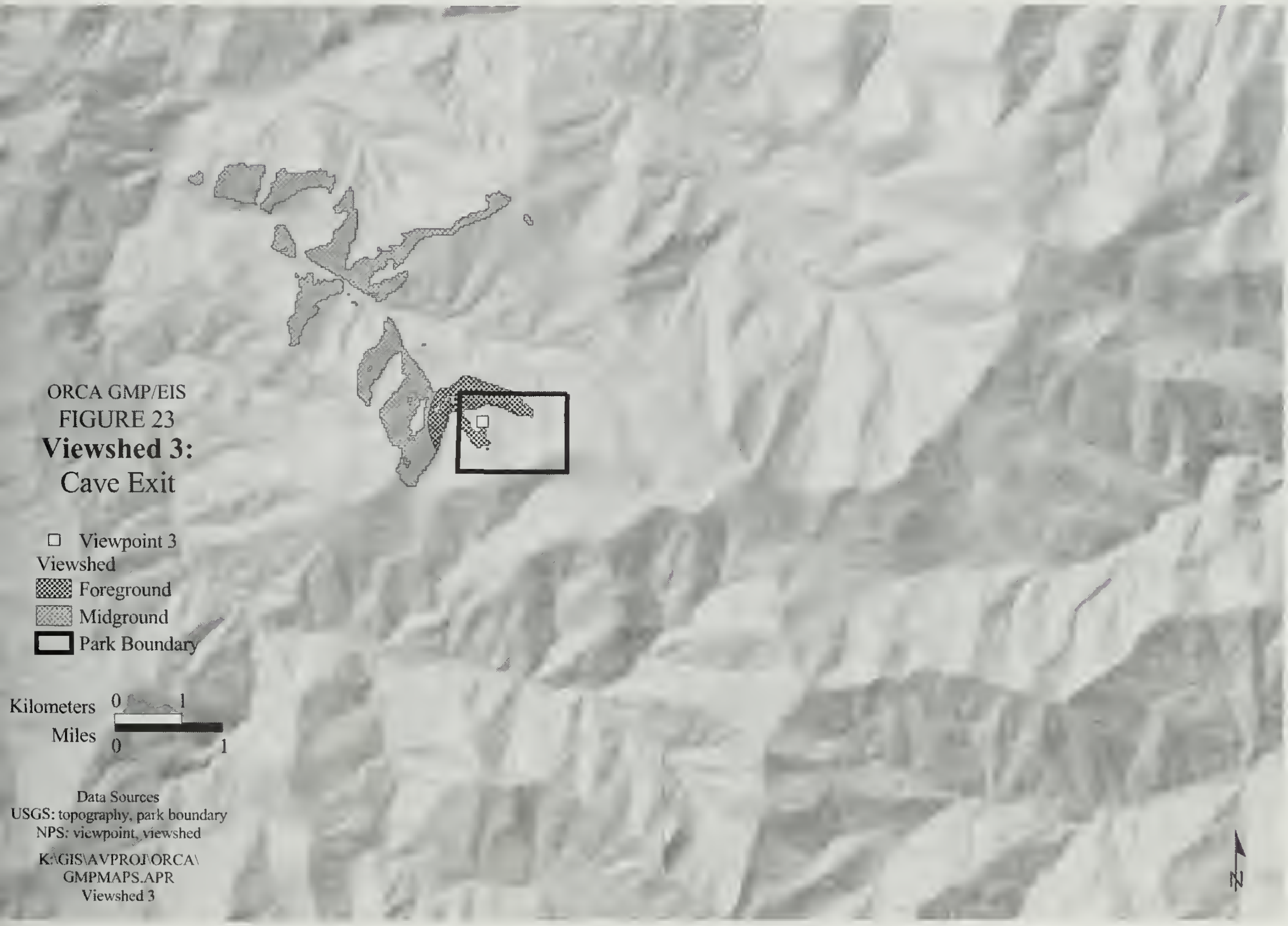
GMPMAPS.APR
Viewshed 2



View from the Cave Exit Looking Northwest



ORCA GMP/EIS
FIGURE 23
Viewshed 3:
Cave Exit

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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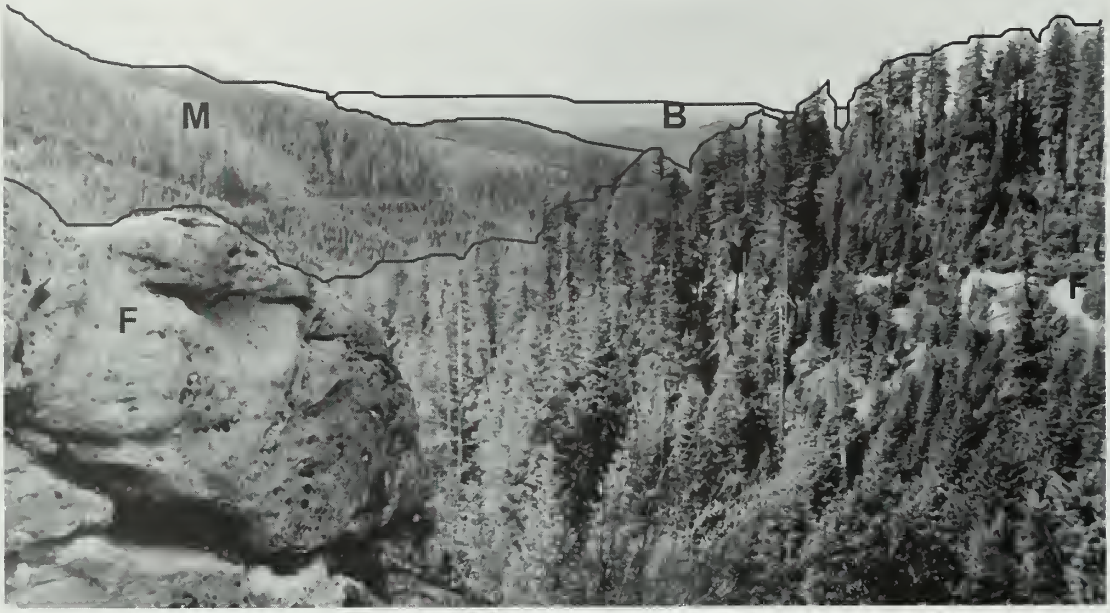
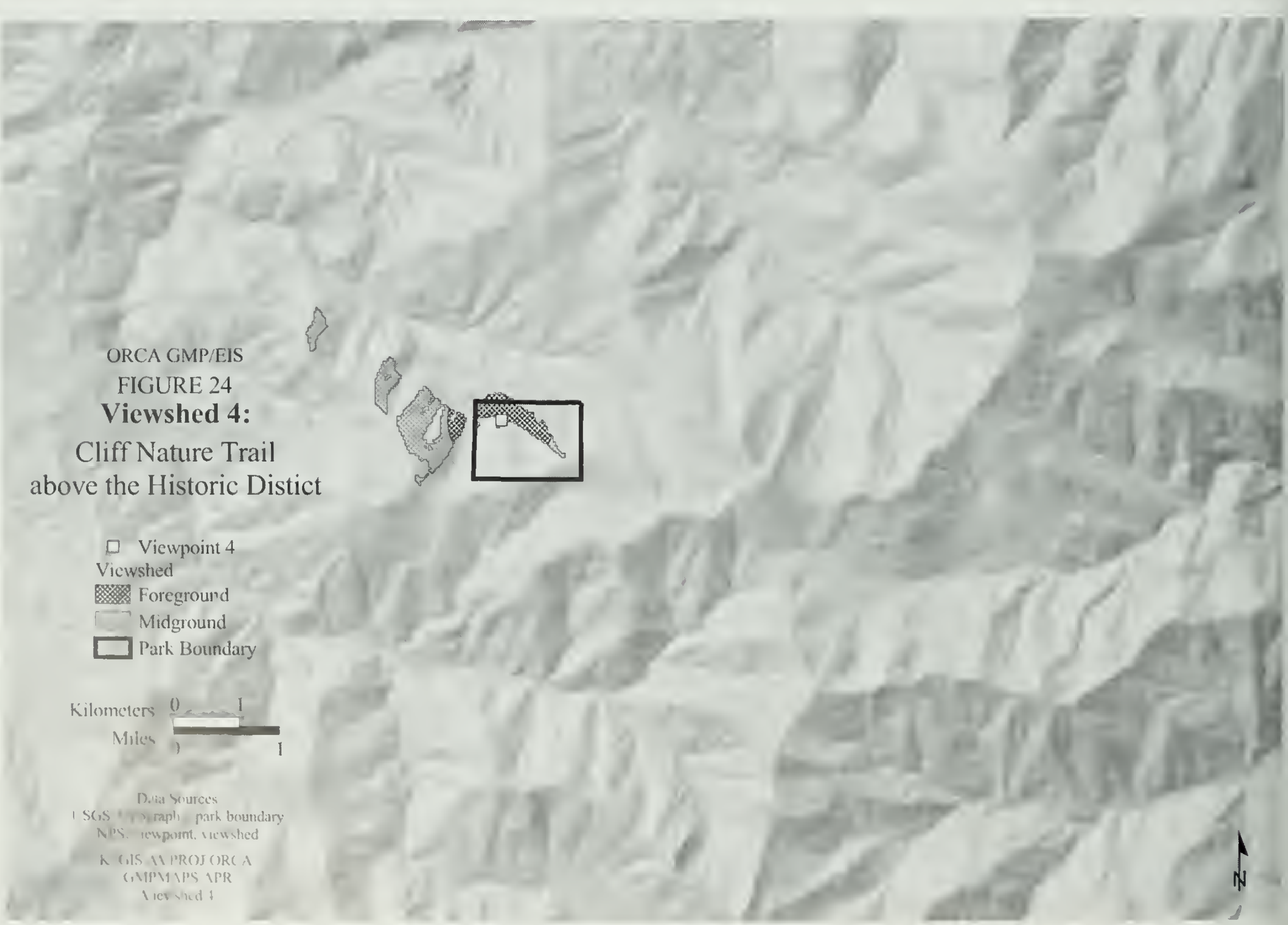
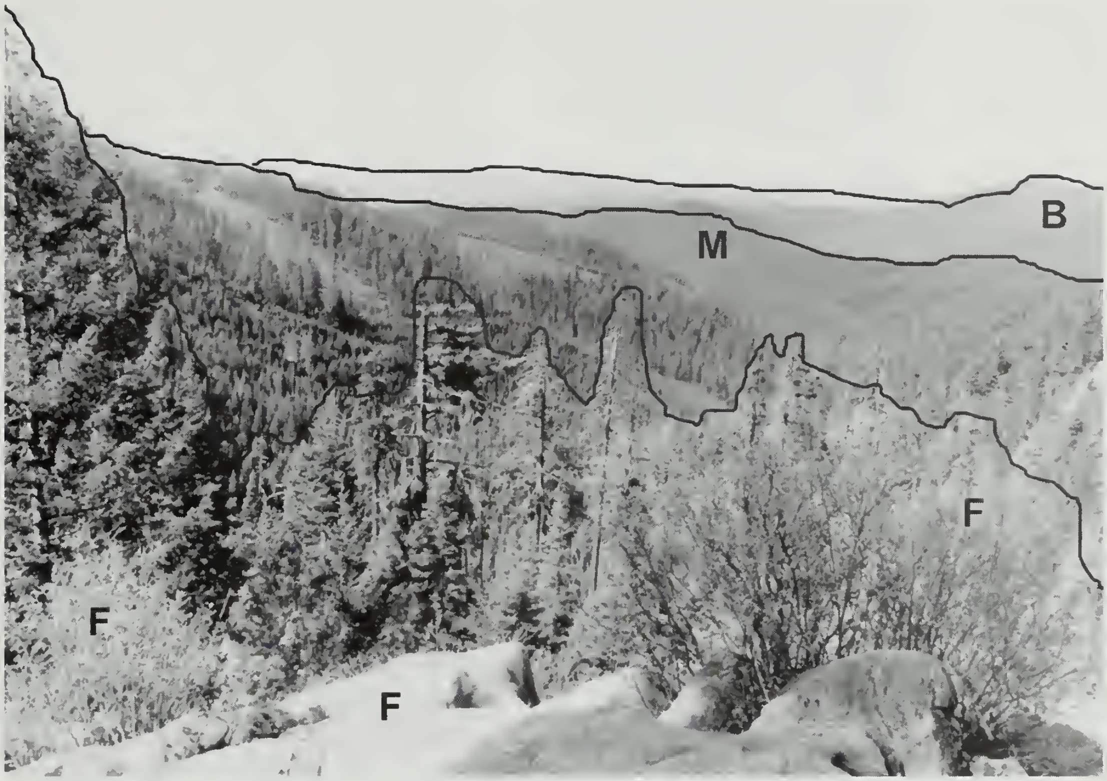
GMPMAPS.APR
Viewshed 3

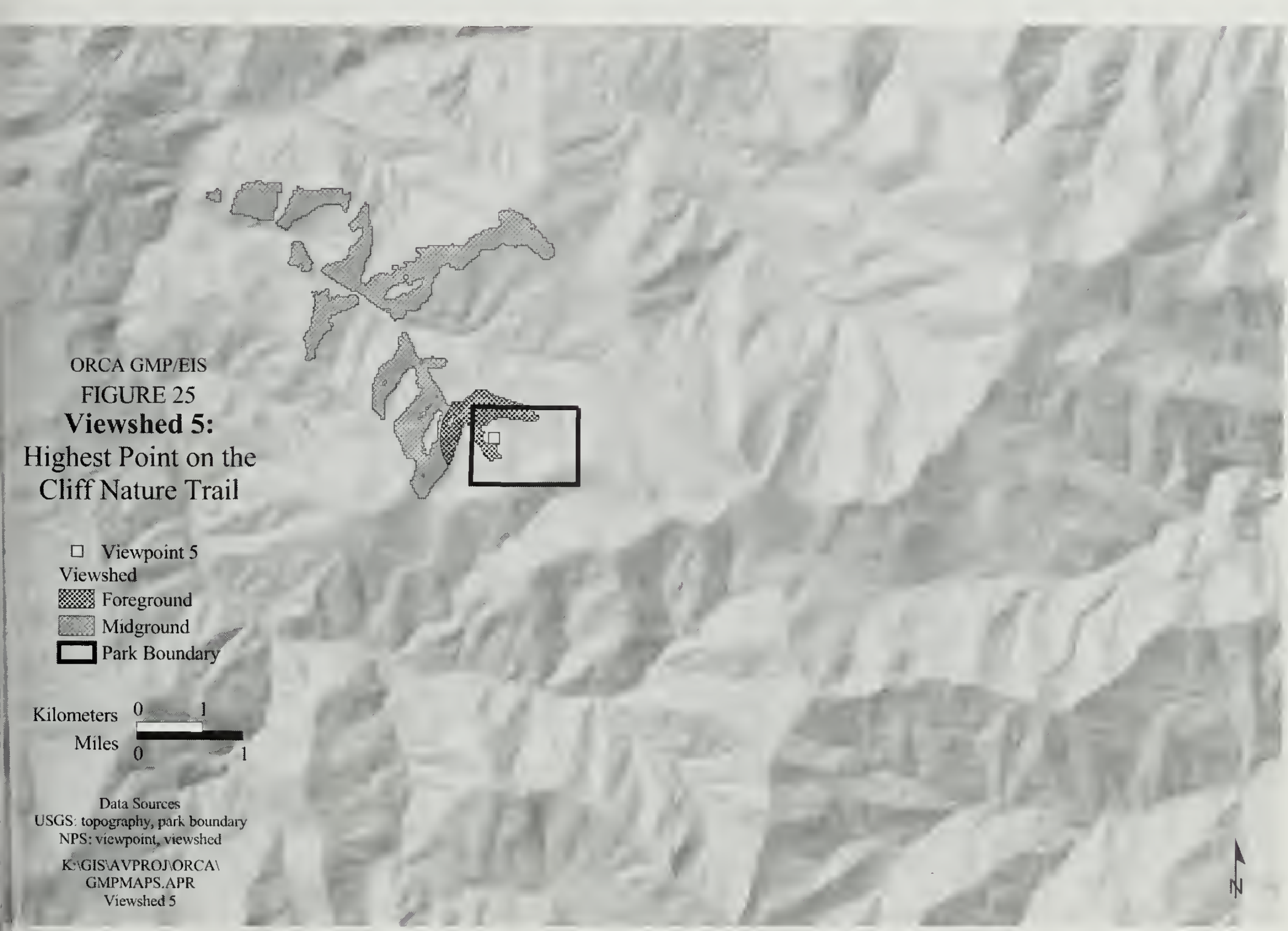


View from the Cliff Nature Trail above the Historic District Looking Northwest


ORCA GMP/EIS
FIGURE 24
Viewshed 4:
Cliff Nature Trail
above the Historic Distict



View from the Highest Point on the Cliff Nature Trail Looking Northwest



ORCA GMP/EIS

FIGURE 25

Viewshed 5:
Highest Point on the Cliff Nature Trail

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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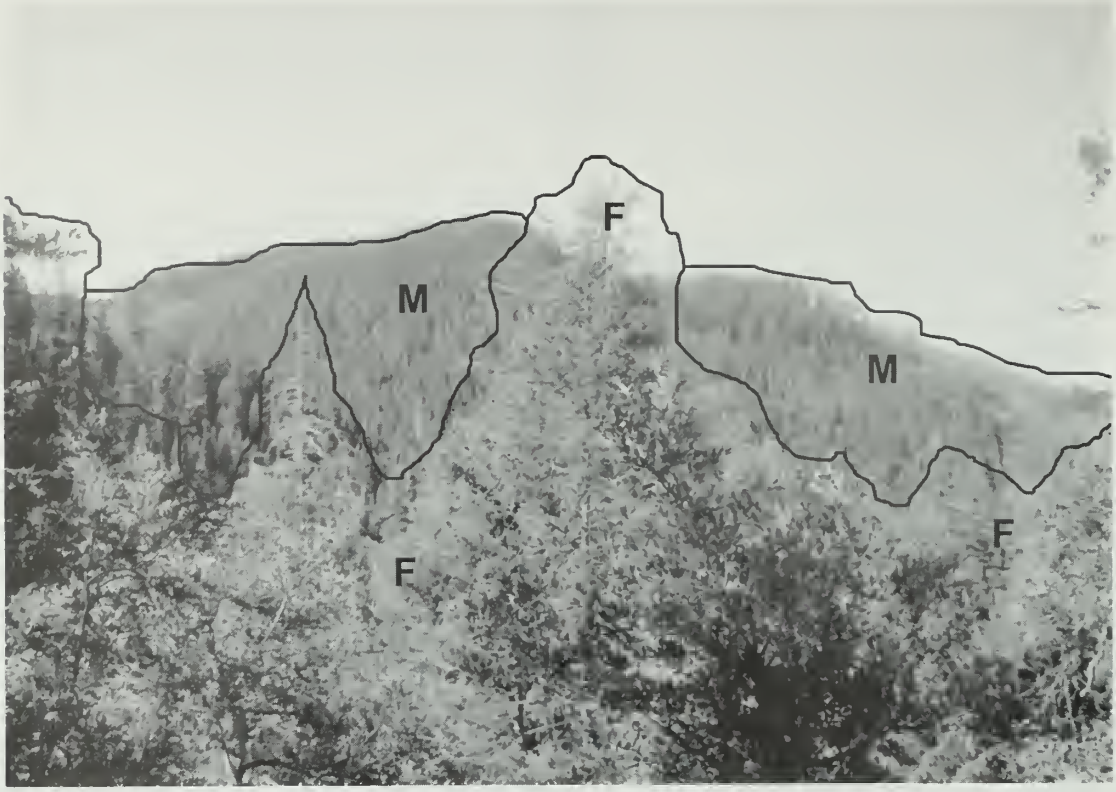
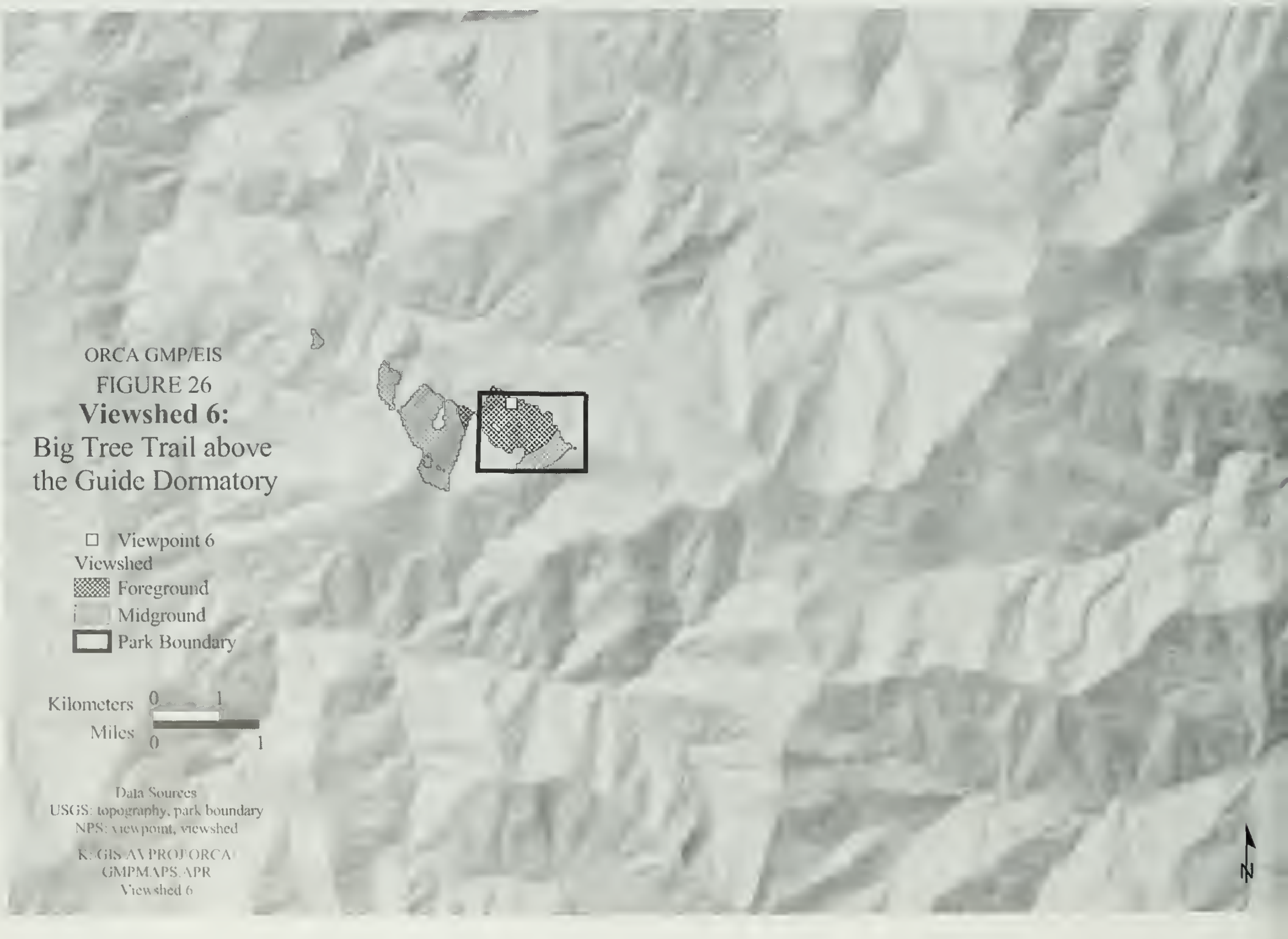
GMPMAPS.APR
Viewshed 5



View from the beginning of the Big Tree Trail above the Guide Dormatory Looking Northwest



ORCA GMP/EIS
FIGURE 26
Viewshed 6:
Big Tree Trail above
the Guide Dormatory

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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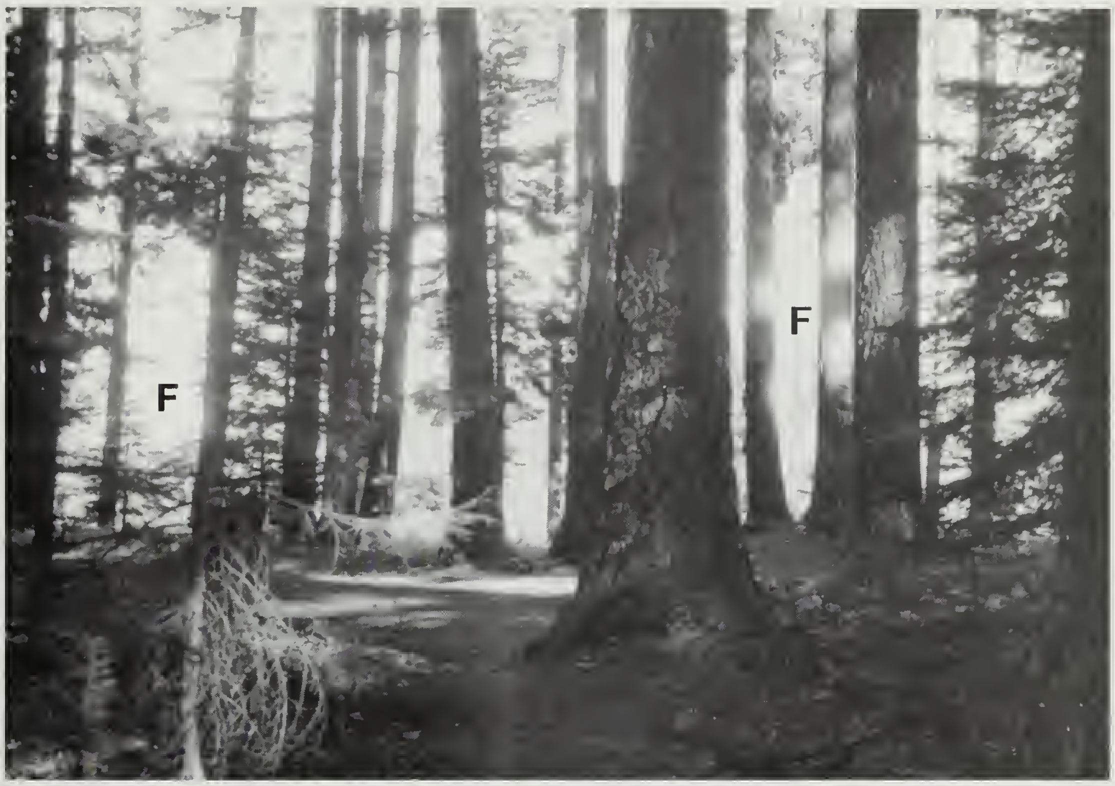
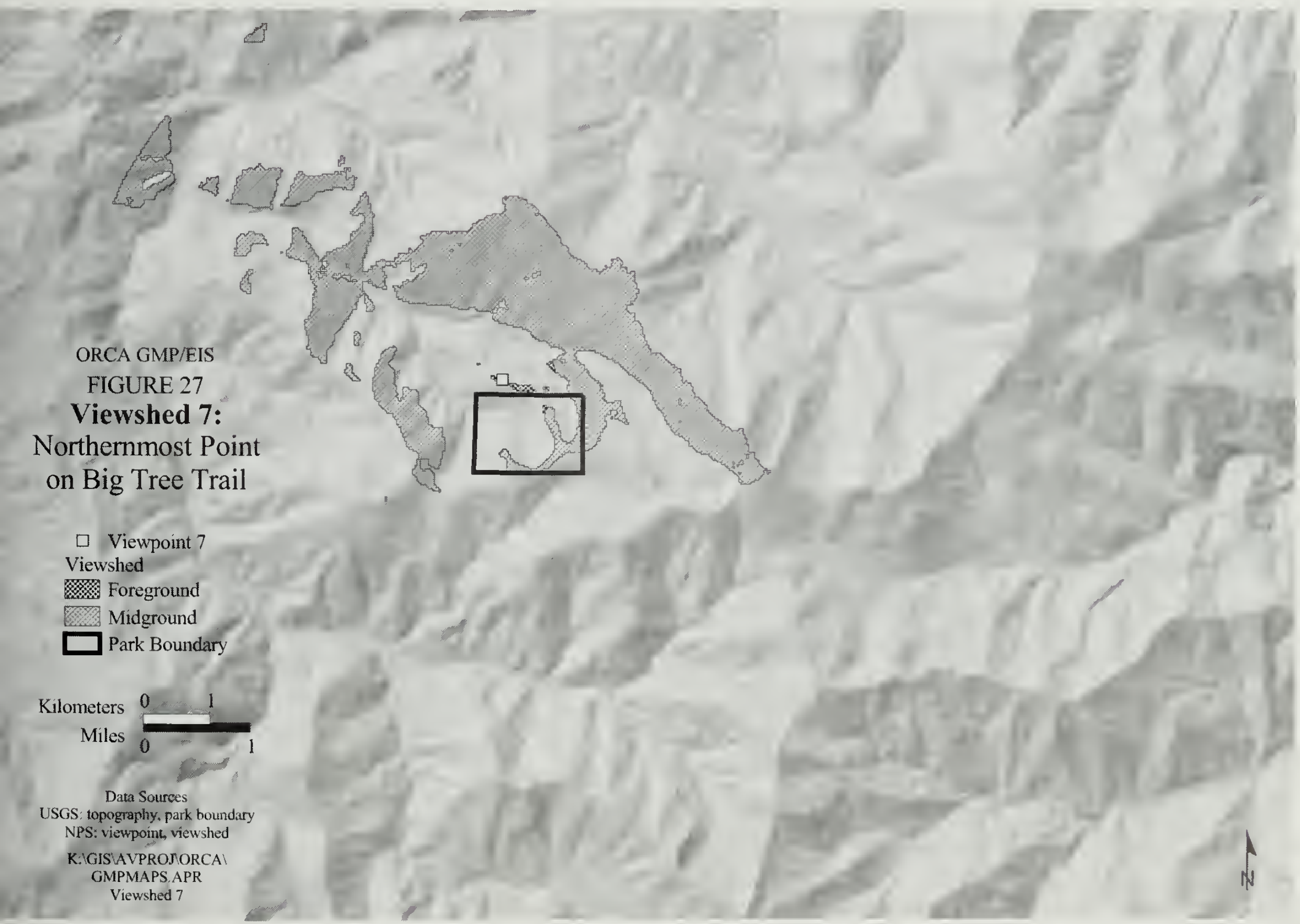
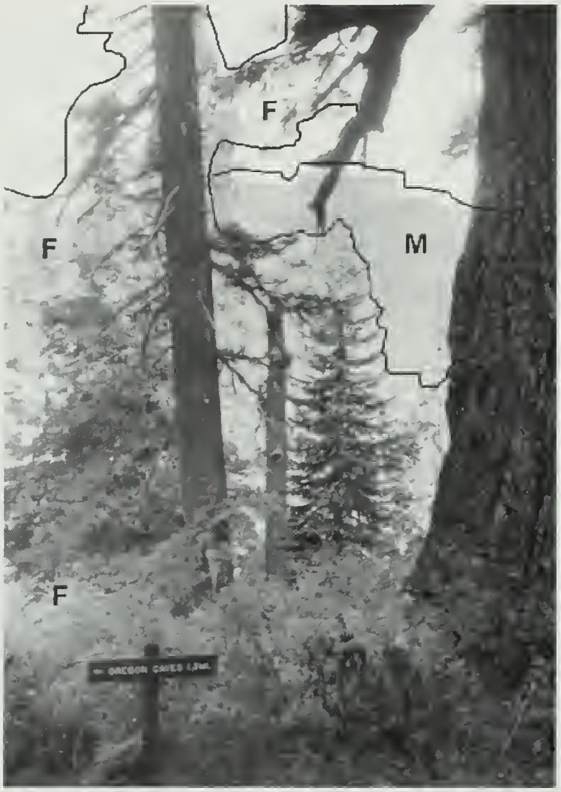
GMPMAPS.APR
Viewshed 6

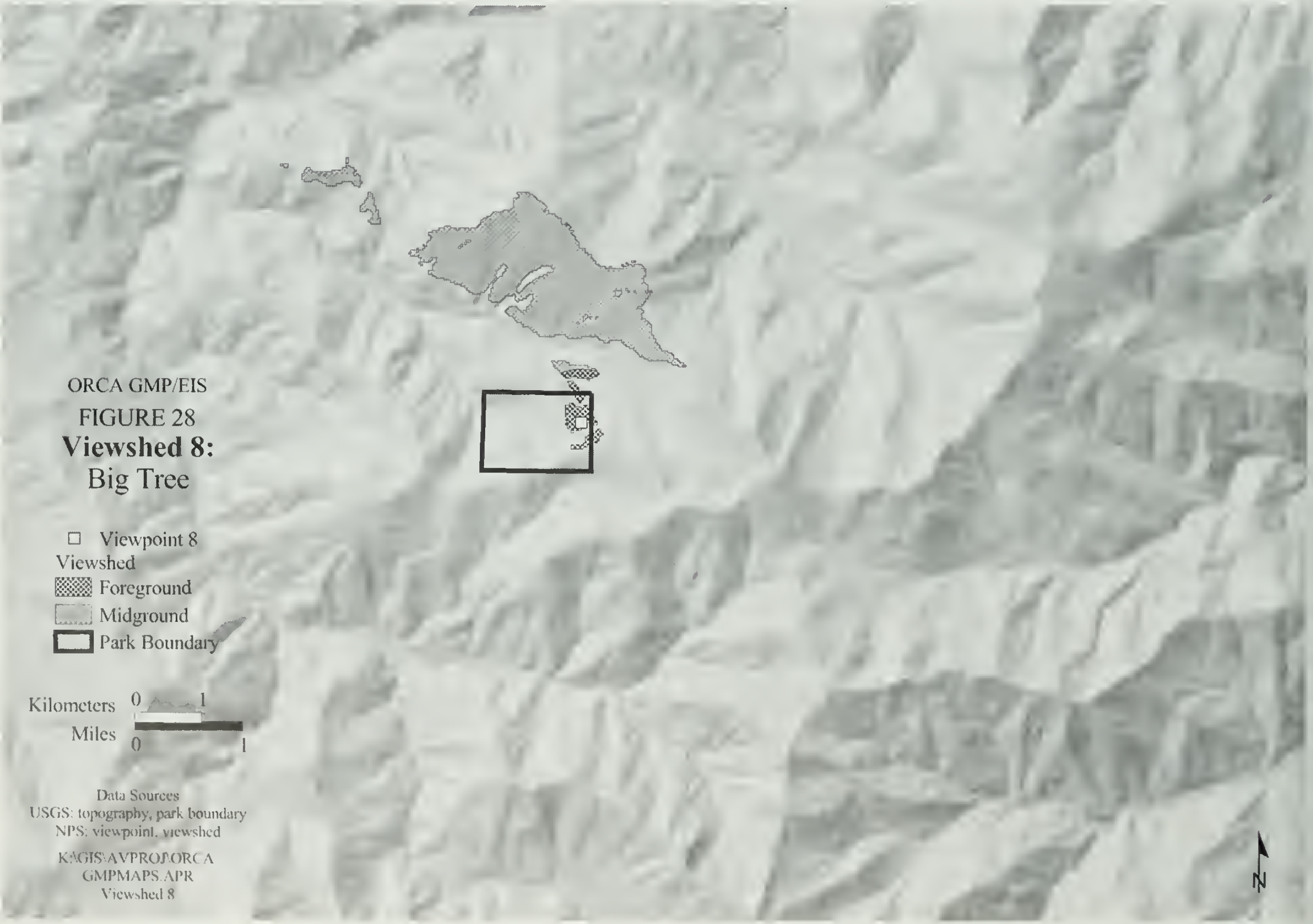


View from the Northernmost Point on Big Tree Trail Looking Northeast


ORCA GMP/EIS
FIGURE 27
Viewshed 7:
Northernmost Point
on Big Tree Trail



View from Big Tree Looking North


ORCA GMP/EIS
FIGURE 28
Viewshed 8:
Big Tree

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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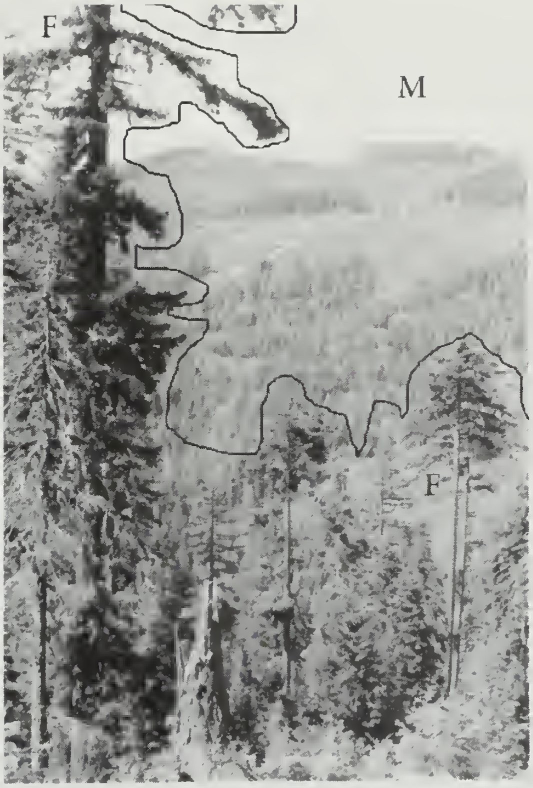
GMPMAPS.APR
Viewshed 8



View from a High Meadow on Big Tree Trail Looking North

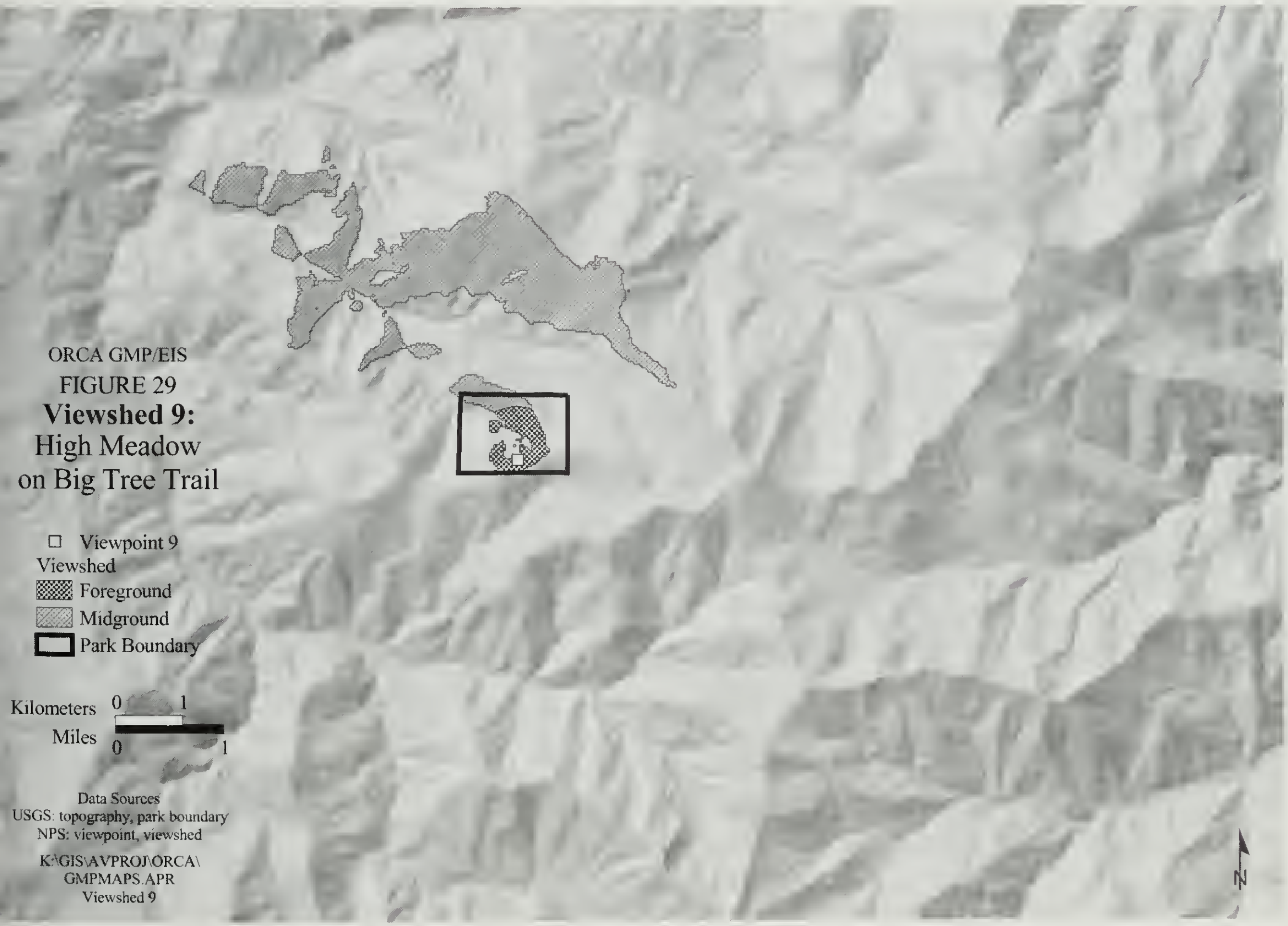

ORCA GMP/EIS

FIGURE 29

Viewshed 9:
High Meadow on Big Tree Trail

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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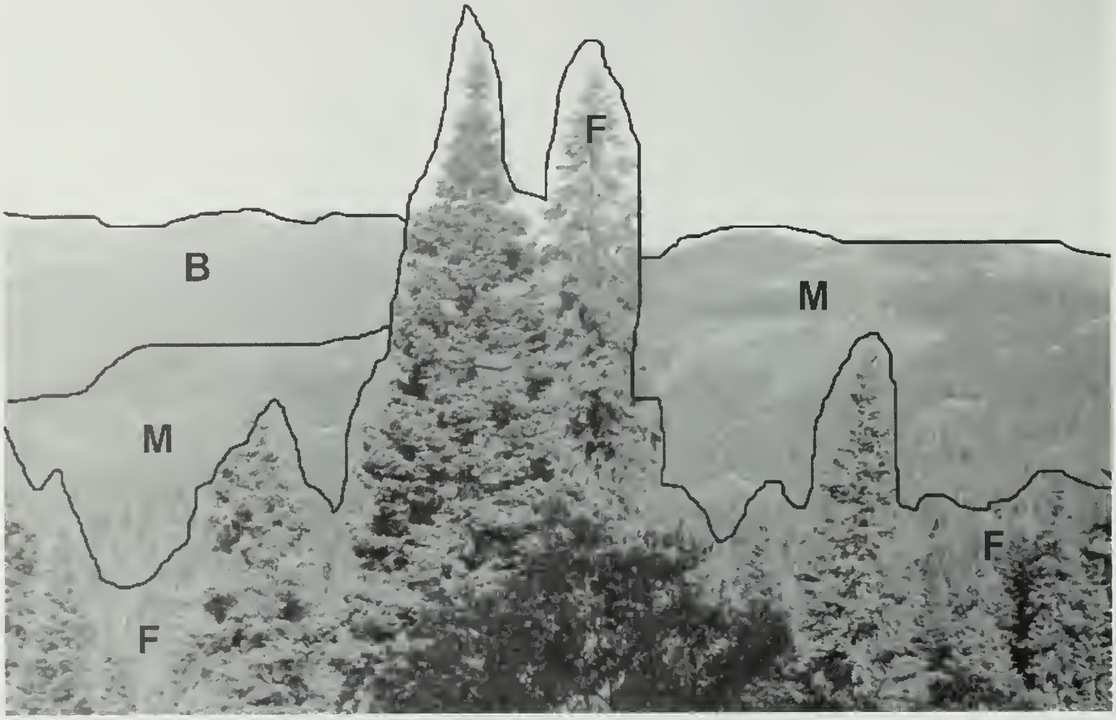
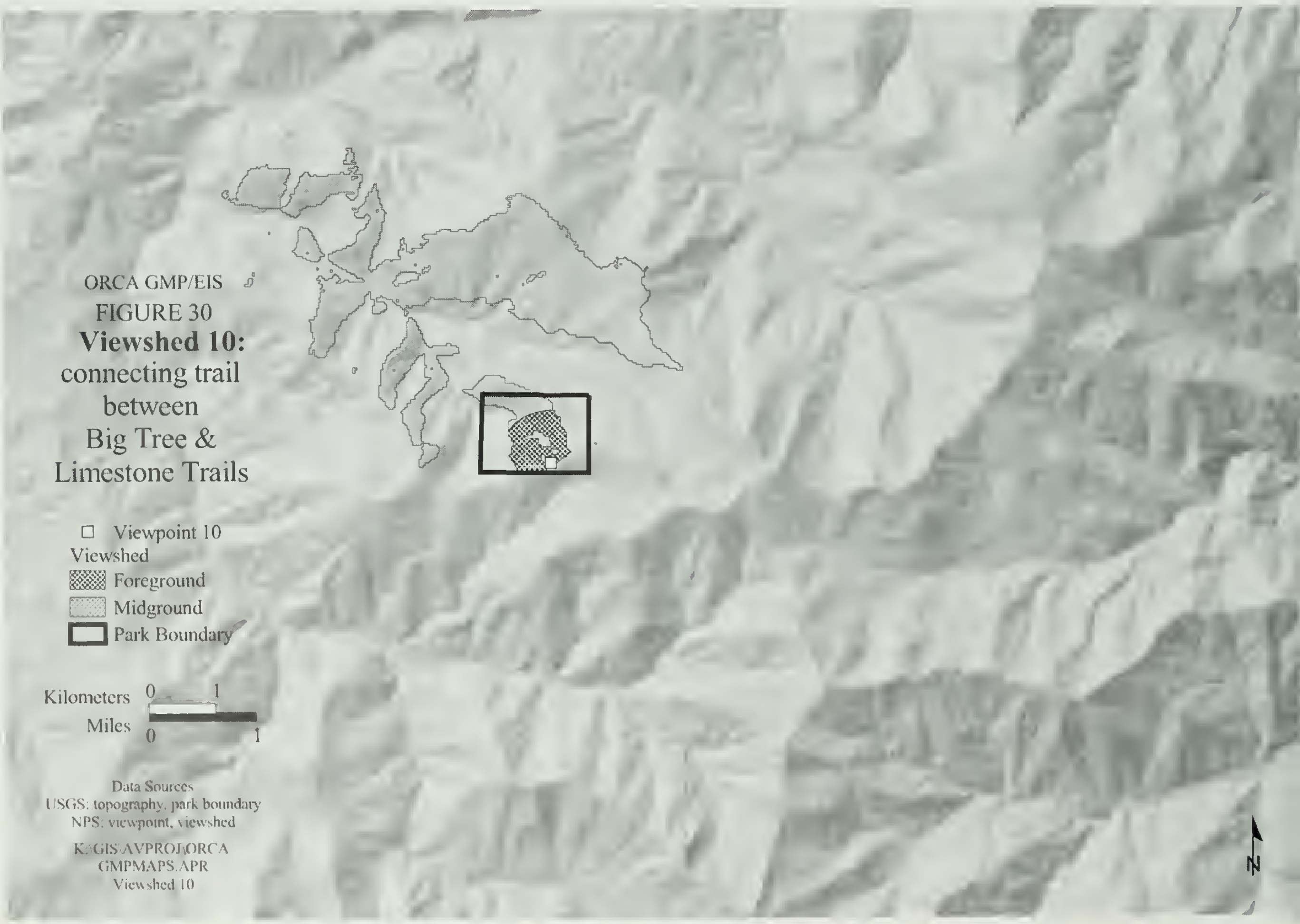
GMPMAPS.APR
Viewshed 9



View from the connecting trail between Big Tree and Limestone Trail
Looking Northeast



ORCA GMP/EIS
FIGURE 30
Viewshed 10:
connecting trail
between
Big Tree &
Limestone Trails

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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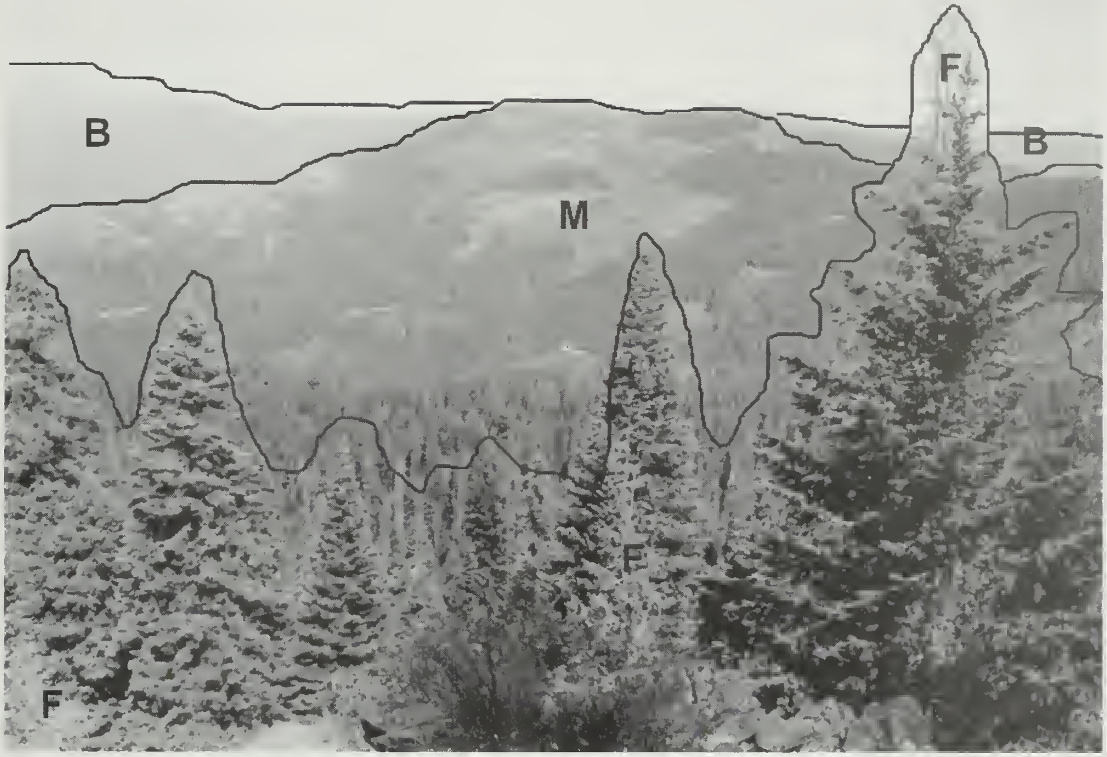
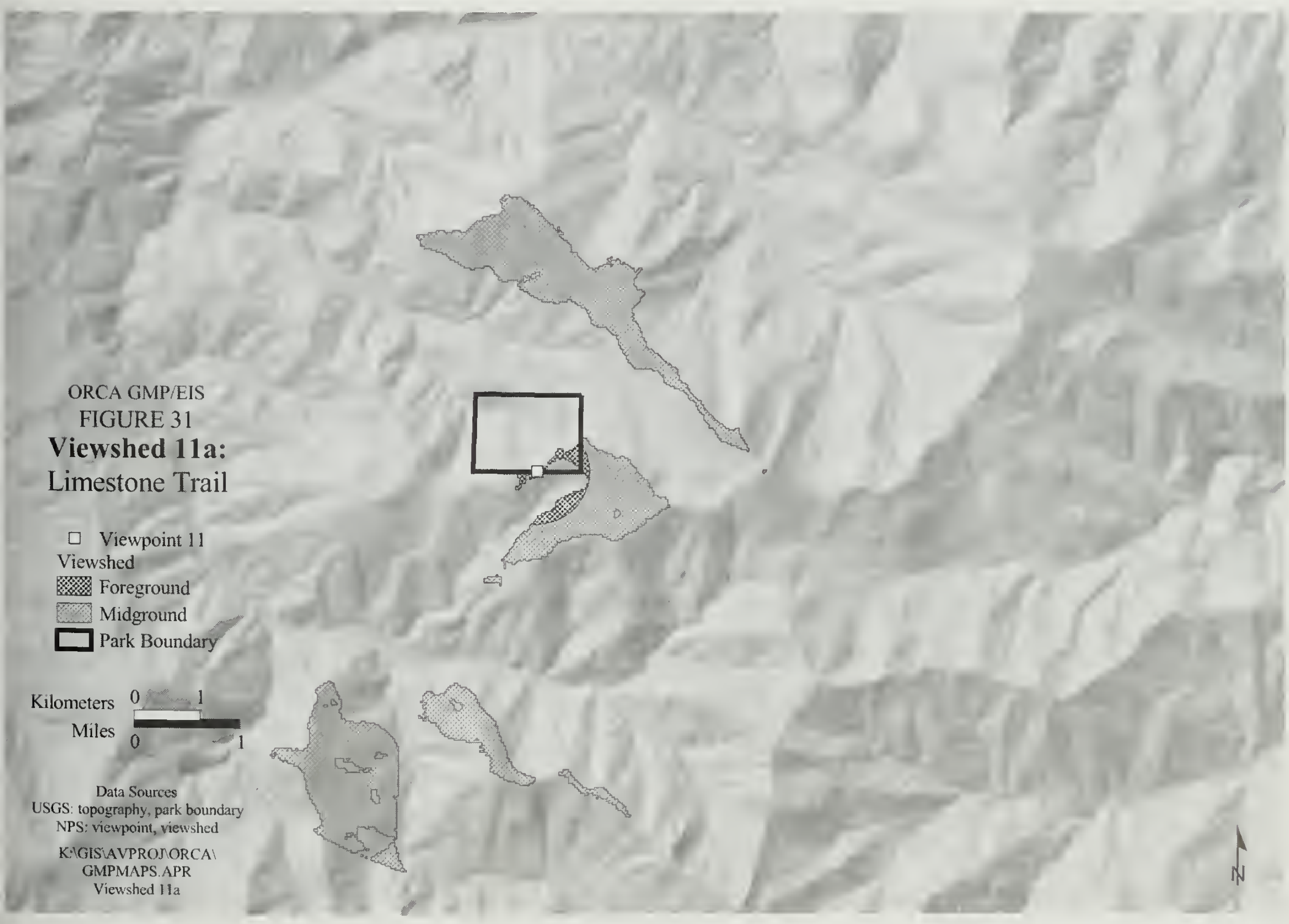
GMPMAPS.APR
Viewshed 10



View from Limestone Trail Looking North, Northeast


ORCA GMP/EIS
FIGURE 31
Viewshed 11a:
Limestone Trail

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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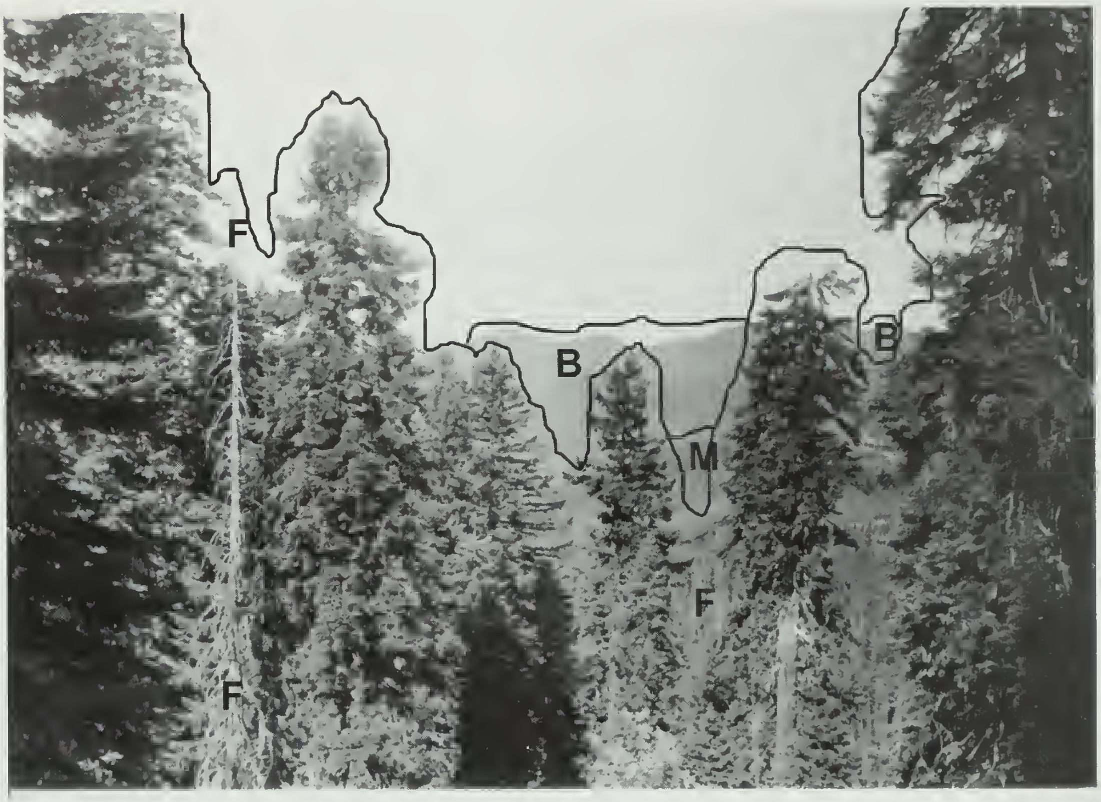
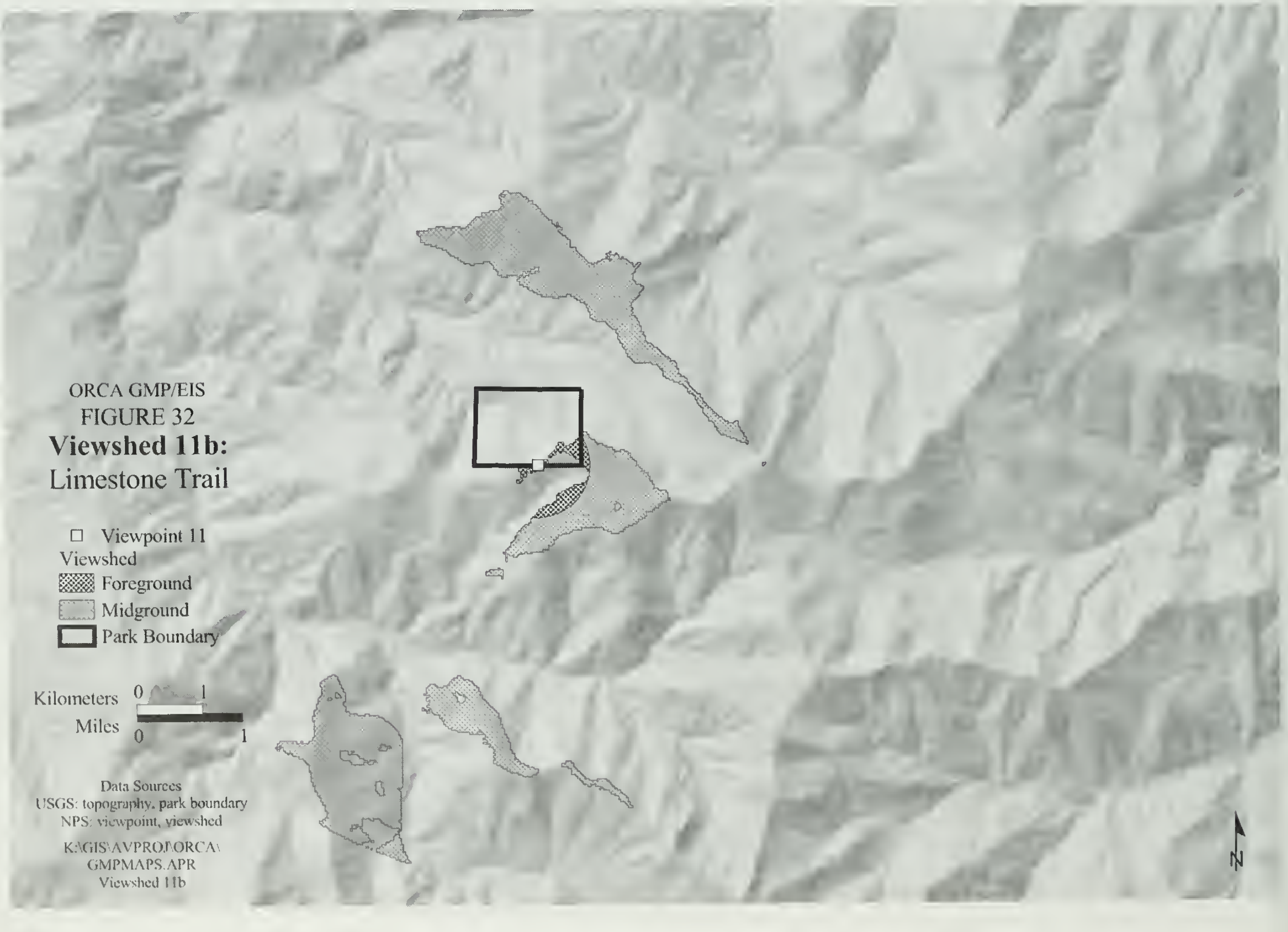
GMPMAPS.APR
Viewshed 11a



View from Limestone Trail Looking South, Southeast



ORCA GMP/EIS
FIGURE 32
Viewshed 11b:
Limestone Trail

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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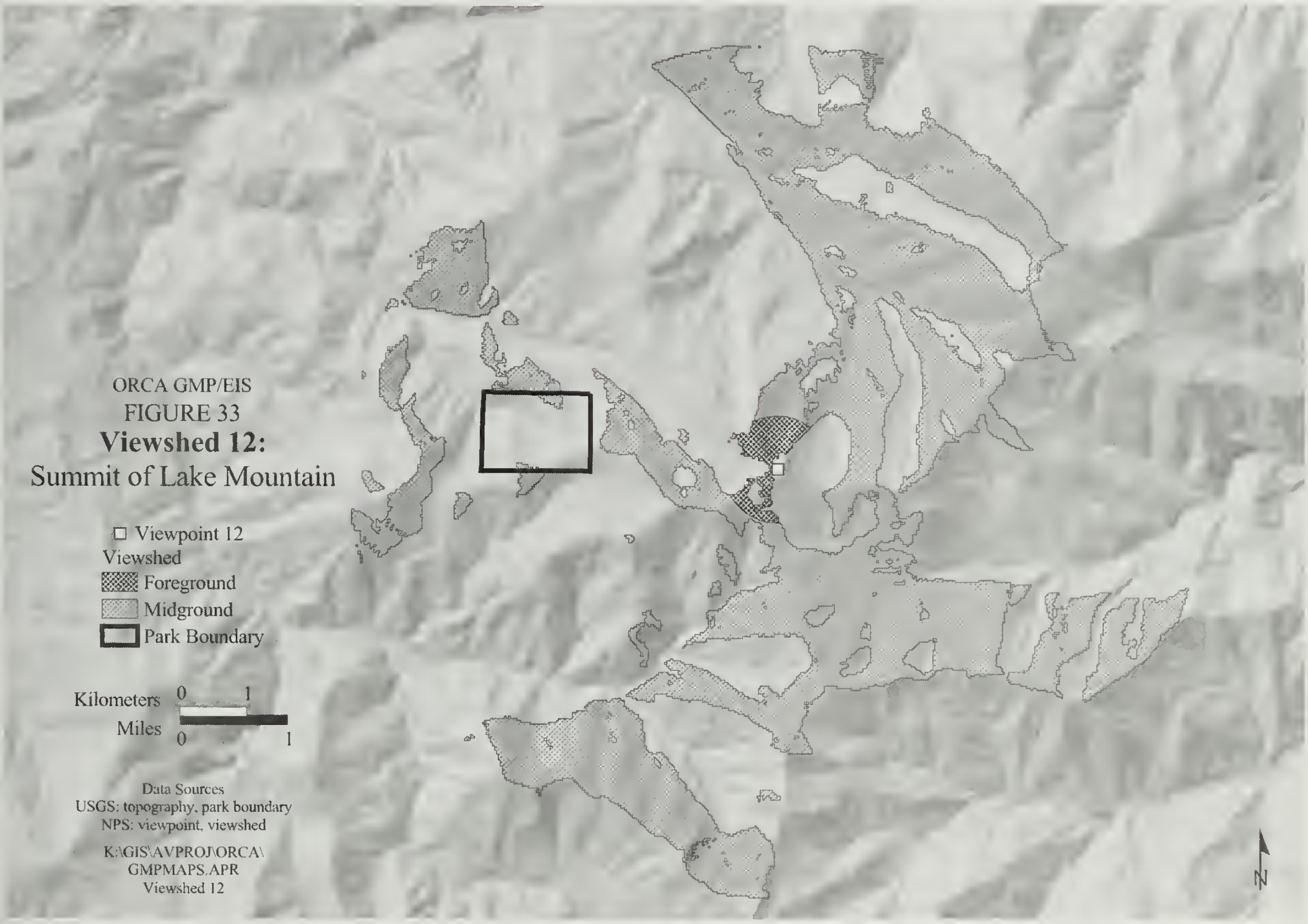
GMPMAPS.APR
Viewshed 11b

View from Summit of Lake Mountain



ORCA GMP/EIS
FIGURE 33
Viewshed 12:
Summit of Lake Mountain

Data Sources
USGS: topography, park boundary
NPS: viewpoint, viewshed

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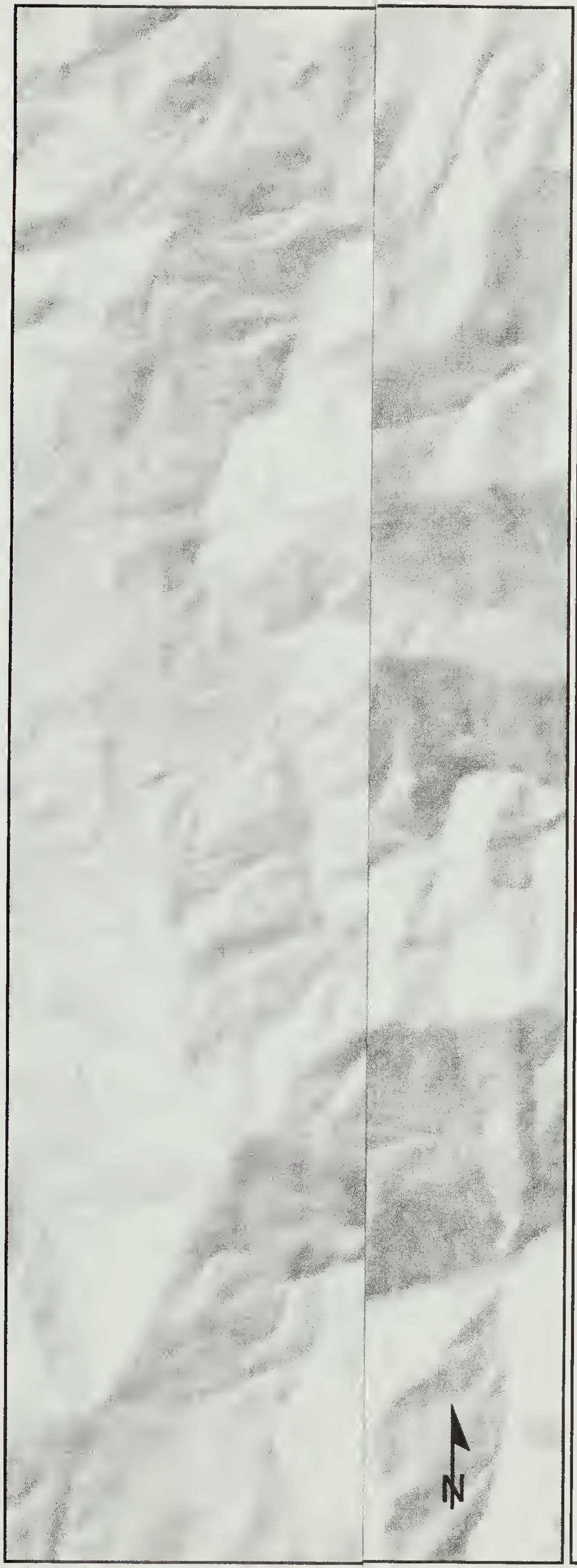
GMPMAPS.APR
Viewshed 12



ORCA GMP/EIS

FIGURE 34

Composite Viewshed

Level I Viewpoints: Foreground

Legend

▭ Park Boundary

Number of points from which area is visible:

- ▢ 1
- ▢ 2
- ▨ 3
- ▨ 4
- ▩ 5
- ■ 6

0 Kilometers 1

0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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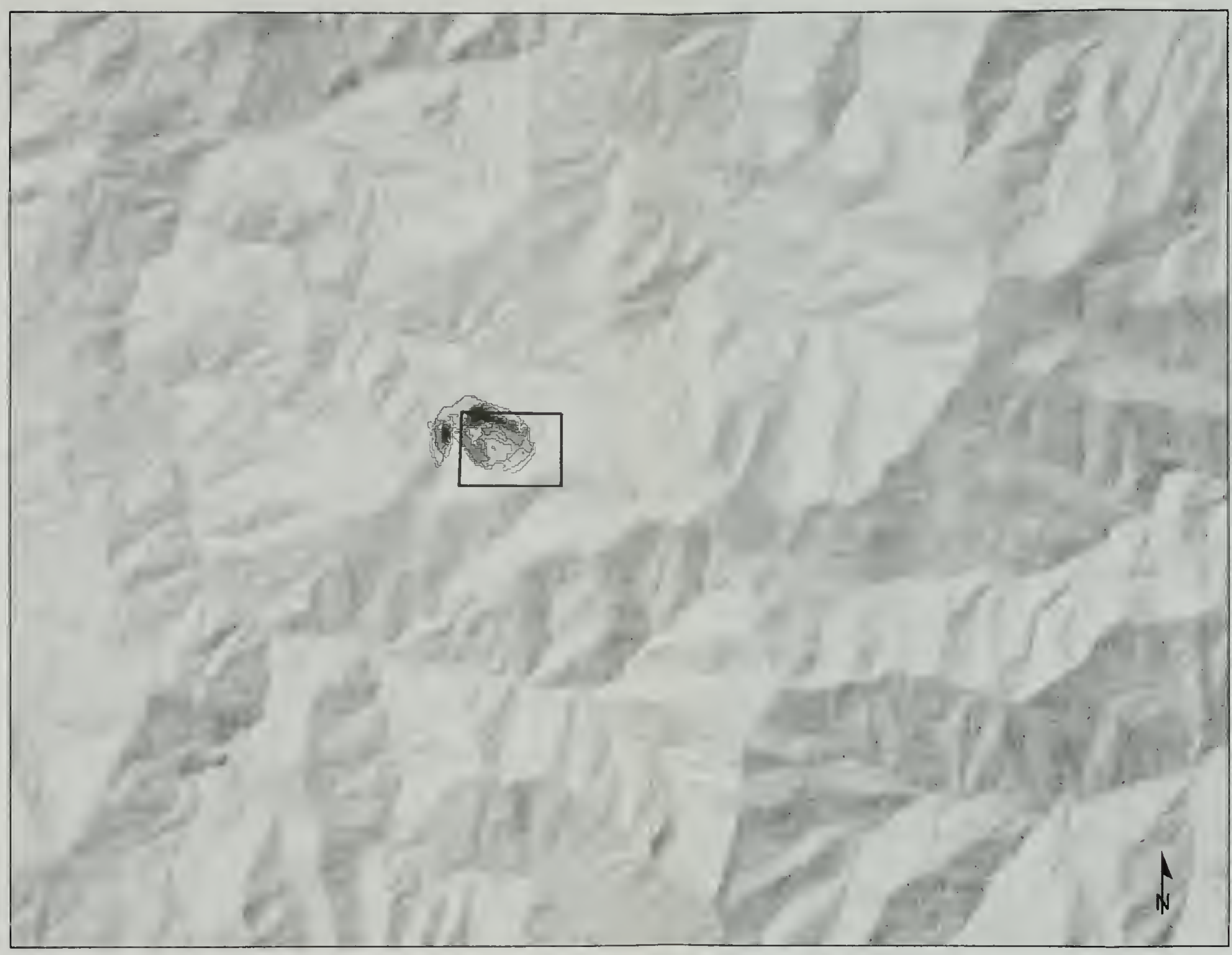
CVSLIF



ORCA GMP/EIS

FIGURE 34

Composite Viewshed

Level I Viewpoints: Foreground

Legend

▭ Park Boundary

Number of points from which area is visible:

░	1
░	2
▒	3
▒	4
▓	5
█	6

0 Kilometers 1
0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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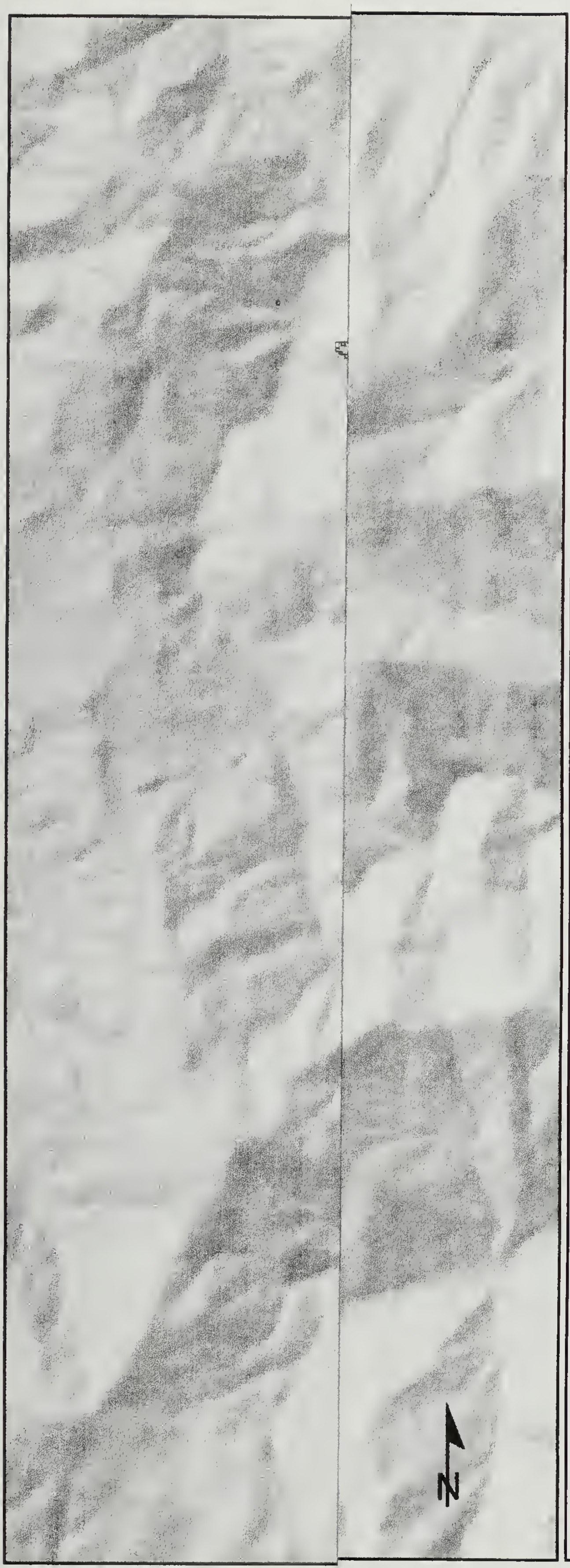
CVSLIF



ORCA GMP/EIS

FIGURE 35

Composite Viewshed

Level I Viewpoints: Midground

Legend

▭ Park Boundary

Number of points from which area is visible:

- ░ 1
- ░ 2
- ▒ 3
- ▒ 4
- ▓ 5
- █ 6

0 Kilometers 1

0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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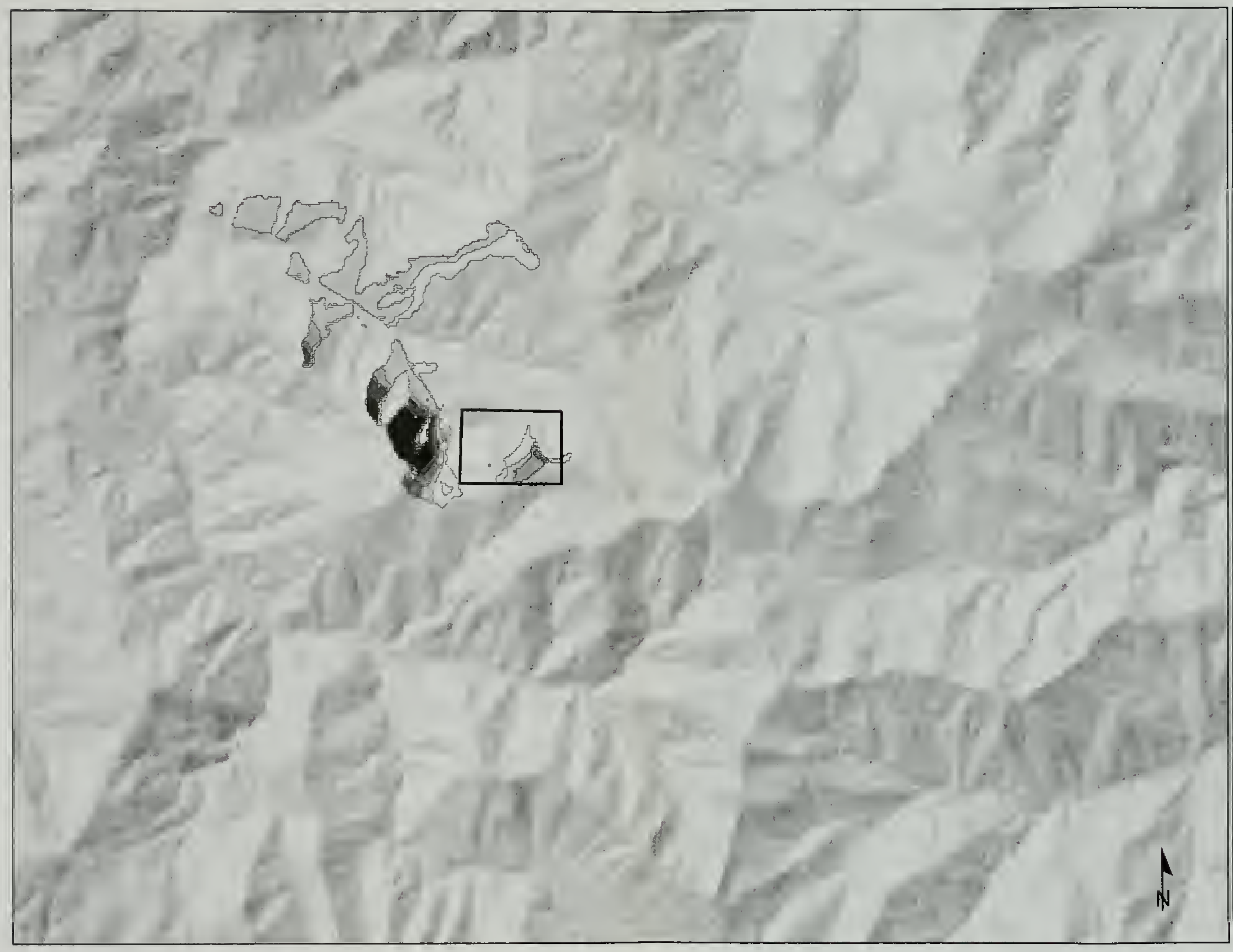
CVSLIM

ORCA GMP/EIS

FIGURE 35

Composite Viewshed

Level I Viewpoints: Midground



Legend

▭ Park Boundary

Number of points from which area is visible:

- ▢ 1
- ▢ 2
- ▨ 3
- ▨ 4
- ■ 5
- ■ 6

0 Kilometers 1

0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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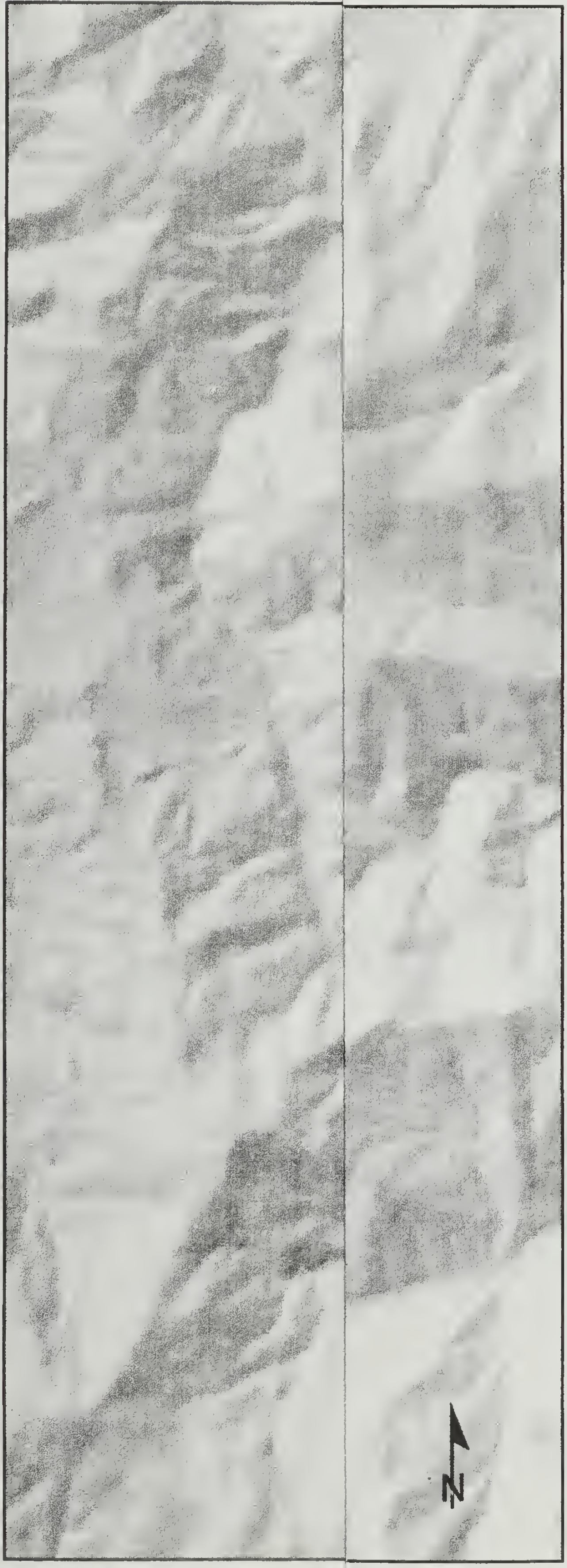
CVSLIM



ORCA GMP/EIS

FIGURE 36

Composite Viewshed

Level II Viewpoints: Foreground

Legend

☐ Park Boundary

Number of points from which area is visible:

☐ 1
░ 2
▒ 3
▓ 4
▓ 5
■ 6

0 Kilometers 1
0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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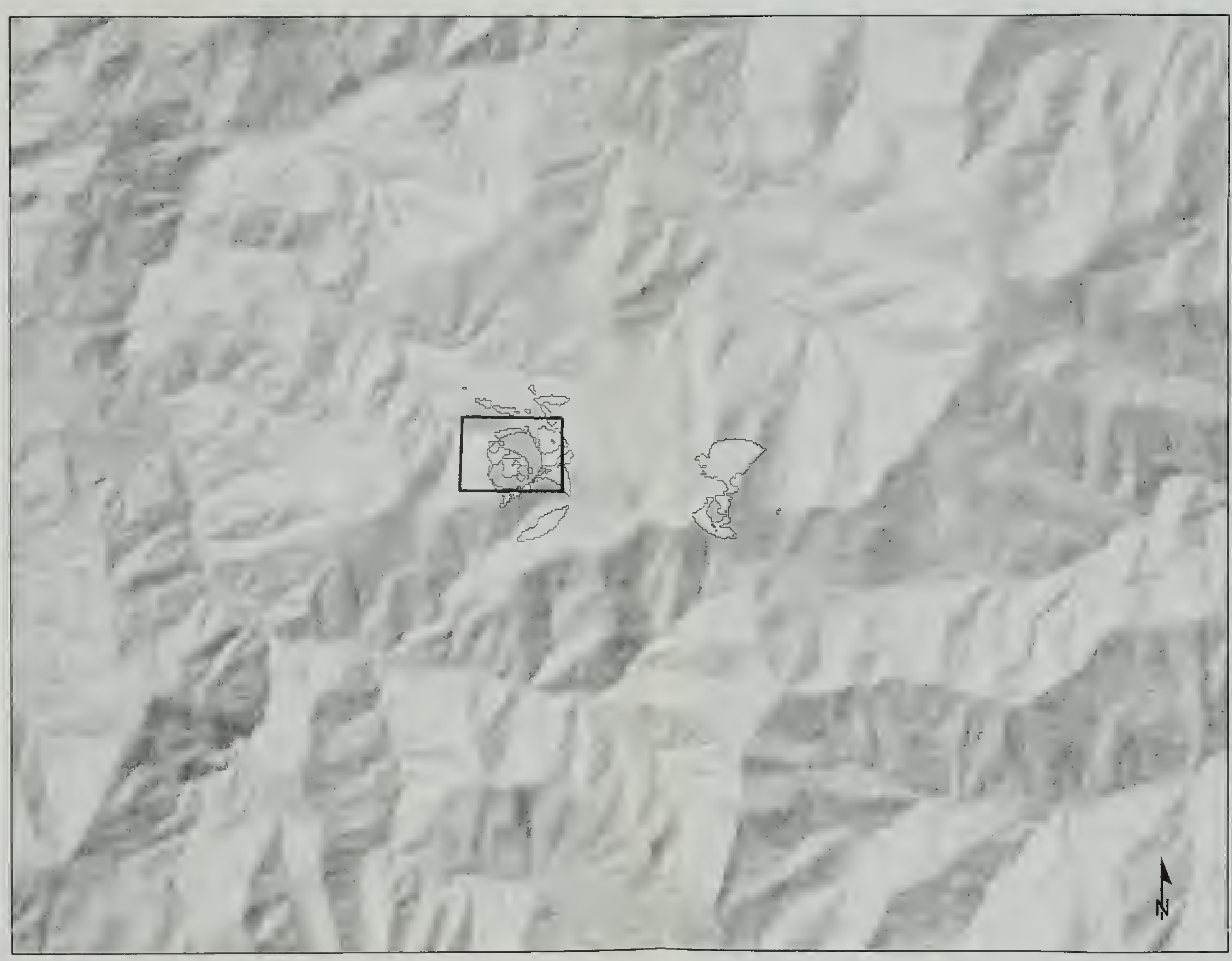
CVSLIIF

ORCA GMP/EIS

FIGURE 36

Composite Viewshed
Level II Viewpoints: Foreground



Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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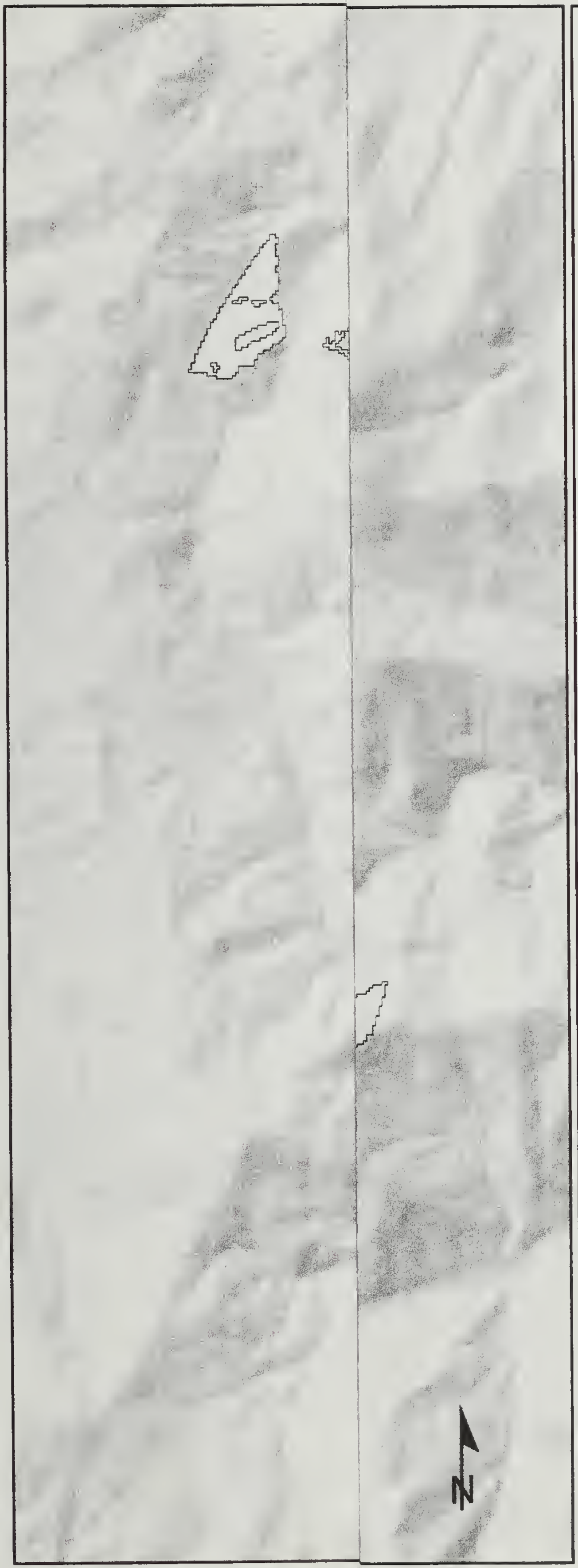
CVSLIIF



ORCA GMP/EIS

FIGURE 37

Composite Viewshed

Level II Viewpoints: Midground

Legend

▭ Park Boundary

Number of points from which area is visible:

- □ 1
- ░ 2
- ░ 3
- ▒ 4
- ▓ 5
- ■ 6

0 Kilometers 1

0 Miles 1

Data Sources:
USGS: topography, park boundary
NPS: viewsheds

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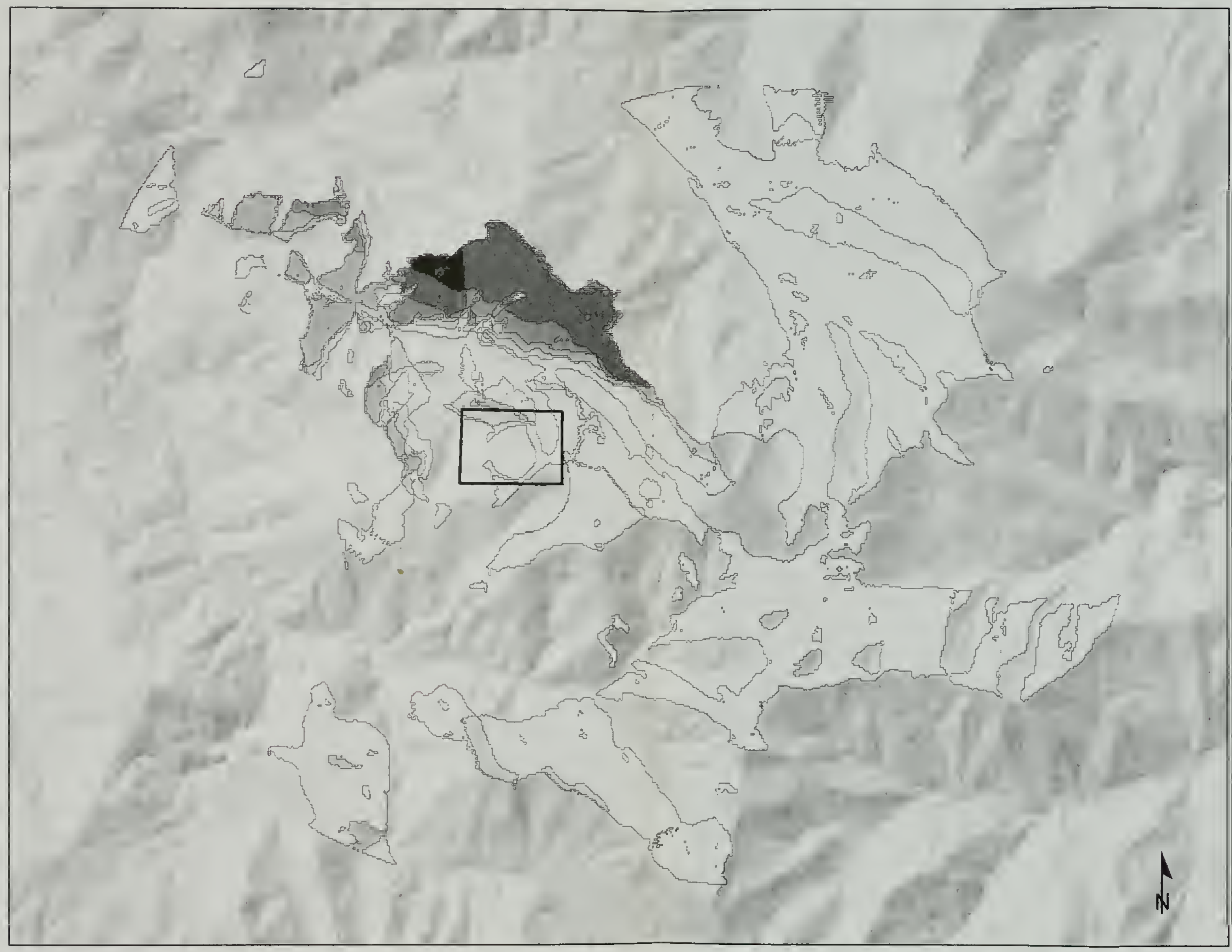
CVSLIIM

ORCA GMP/EIS

FIGURE 37

Composite Viewshed

Level II Viewpoints: Midground



Data Sources.
USGS. topography, park boundary
NPS: viewsheds

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CVSLIM

The following information resulted from analyzing the four composite viewsheds for each alternative developed in the Alternatives chapter.

Alternative	**% Views Protected Within Monument Boundary**	**% Views Protected Within Protected Area**	**Total % Views Protected**
Alternative A • Level I Sensitivity - Foreground	69%	Not Applicable (NA)	69%
• Level I Sensitivity - Middleground	6%	NA	6%
• Level II Sensitivity - Foreground	54%	NA	54%
• Level II Sensitivity - Middleground	1%	NA	1%
Alternative B • Level I Sensitivity - Foreground	69%	31%	100%
• Level I Sensitivity - Middleground	6%	56%	62%
• Level II Sensitivity - Foreground	54%	13%	67%
• Level II Sensitivity - Middleground	1%	36%	37%
Alternative C • Level I Sensitivity - Foreground	100%	NA	100%
• Level I Sensitivity - Middleground	62%	NA	62%
• Level II Sensitivity - Foreground	67%	NA	67%
• Level II Sensitivity - Middleground	37%	NA	37%
Alternative D • Level I Sensitivity - Foreground	100%	0%	100%

• Level I Sensitivity - Middleground	55%	7%	62%
• Level II Sensitivity - Foreground	67%	0%	67%
• Level II Sensitivity - Middleground	15%	22%	37%

Existing Park Development and Programs

Roads and Parking

State Highway 46 terminates at the entrance to the Monument, where the main parking area is located. In 1989, the USFS extended USFS Road 960 to connect with this parking area to provide an emergency evacuation route in case of closure of State Highway 46 due to wildland fire. No roads pass through the Monument. Total road inventory on Monument land consists of one-half mile, with another two-tenths mile on USFS land at the administrative site. These roads are currently maintained by Monument staff.

The public is served by two paved parking areas at the Monument. Daytime visitors use the main parking area adjacent to the Checking and Comfort Station (73 spaces for cars and 26 spaces for RVs). Currently there are no spaces designated specifically for buses; they use some of the RV spaces. Overnight guests and concession employees utilize the upper parking area located near the Chateau (48 spaces for cars and 5 for RV). Accessible parking spaces for persons with disabilities are designated at each location (4 spaces). Both parking areas are in need of stabilization and rehabilitation, and the access road and associated rock walls between the two areas will need major work in the near future.

A series of storms during December 1996 through January 1997 caused serious, widespread damage to roads, utilities, and buildings throughout the West, including the Oregon Caves area. One of the damage sites included the former Monument headquarters building, surrounding parking area and access road. Slumping at this site resulted in depressions and cracks in the parking area, road and within the Monument headquarters building. Geotechnical investigations indicate a fairly deep-seated, steeply-sloping failure zone. This slope is expected to be stabilized under the Emergency Funding for Federally Owned Roads program in 1998.

The IVVC parking lot provides parking for 30 cars, including 4 RV spaces and two designated spaces for visitors with disabilities. The existing pavement is in poor condition, with several large pot-holes and slumping caused by underlying drainage and structural deficiencies. This parking lot needs rehabilitation in the near future.

Trails

The Monument trail system is seven and six-tenths miles long. This includes a self-guiding nature trail. Greater opportunity for hiking exists than is indicated by the total miles of Monument trails. Most NPS trails connect with USFS trails, this allowing access to many miles of hiking and wilderness. There are ten trails located within the Monument, including a connecting trail between Big Tree Loop Trail and Lake Mountain Trail, and another connecting trail to No Name Trail. No Name, Big Tree, Limestone, Cave Creek, and Lake Mountain trails exit the Monument and continue into the adjacent SNF. (Refer to Figure 20, Viewpoints: Level I and II for trail location.)

Trails contained entirely within the Monument boundary are the Cliff Nature Trail and the Connecting Trail. Through an informal agreement with the USFS, Monument staff maintain these segments of trail outside the Monument which adds one to two miles of additional trail maintenance. These trails within the Monument are intended for hiking—no horse trails are allowed because of the potential spread of exotic plants into the Monument's boundary. No motorized vehicles are allowed on the trails. Trail surfaces are dirt and asphalt and are in fair condition. The following summarizes information about trails completely or partly within Oregon Caves National Monument.

Cliff Nature Trail

This moderately steep loop trail that extends eight-tenths of a mile in length and takes the average visitor about 40 minutes to hike. The trail extends between the Exit Trail coming out of the cave and the Big Tree Loop Trail, with elevations ranging from 4270 to 4390 feet. The trail is the most widely used trail in the Monument, and provides visitors with an introduction to an old-growth Douglas fir forest. The trail receives its heaviest use during the summer months, and the dense forest canopy provides shade for hikers. There are natural overlooks with stunning views into the distance. Benches are located along the way to stop and enjoy the scenery, watch wildlife, or to pause and enjoy the spectacular views of the Illinois Valley.

This is the only trail with interpretive signs along the route, which discuss the relationship between the surface environment and the underground cave. Wildlife commonly seen along the Cliff Nature Trail include white-tailed deer, pileated woodpecker, Townsend's chipmunks, golden-mantled ground squirrels, Pacific giant salamanders, rubber boas, and occasionally black bears. The trailhead for this trail is located at the Chalet building, or from the cave exit after completing the cave tour.

Big Tree Loop Trail

This is a three mile round-trip loop trail that begins and ends at the Chalet. The trail climbs steeply (1000 feet in one and one-half miles) through old-growth Douglas fir forest, one of the best examples of this forest within the national park system. The trail, built by the CCC, passes out of the Monument onto the SNF for six-tenths of a mile before re-entering the Monument. The trail is named for its principal feature—the largest Douglas fir in the region. The Big Tree is 160 feet tall, over 13 feet in diameter, and has a circumference of over 41 feet. This tree has survived for 1,200 to 1,500 years.

If the north fork of the Big Tree Loop Trail is taken, it provides a more gradual climb out of the Monument. The trail climbs through ancient trees to the 4,500 foot level into the neighboring SNF where it follows a ridge gradually climbing to 4,800 feet. The trail wraps back into the Monument and into a small drainage where the Big Tree grows.

From the Big Tree, the trail climbs gradually to 5,000 feet to a grassy, high mountain meadow, that is usually difficult to hike during winter months because it is snow covered until spring. By June, the meadow is covered with wildflowers which include columbine, false hellebore, and three species of orchids. At this point, the trail spurs off, and provides access to several USFS areas including the Bigelow Lakes Botanic Area, spectacular views as seen from the top of Mount Elijah, and the primitive beauty and isolation of the Red

Buttes Wilderness.

After passing this point, the remainder of the Big Tree Loop Trail is downhill, and the predominate tree type changes from Douglas fir to white fir and cedar in the wetter areas. Small creeks appear, traveling a short distance above the ground and then disappearing, possibly plunging into the marble cave system which lies within the mountain. As the visitor approaches the Chalet, the Big Tree trail is joined by the Cliff Nature Trail for the final one-quarter mile to the loop trail's end.

Lake Mountain Connecting Trail

This is a short two-tenths of a mile trail that connects the Big Tree Loop Trail with the Lake Mountain Trail. The trail is completely within the Monument.

Lake Mountain Trail

This trail runs for five miles (one way) along the crest of the mountains above the Monument. The portion of this trail west of the Lake Mountain Connecting Trail is within the SNF and is not maintained. The section east of the Lake Mountain Connecting Trail is open and in good shape. This segment of the trail climbs to Mt. Elijah, and then to Lake Mountain, both of which overlook Bigelow Lakes.

Exit Trail

This trail starts at the exit of the cave and proceeds down to the Chateau. The trail is paved, lighted, and is used primarily as a route for visitors to return to their vehicles or to the Chateau after taking the cave tour. The Exit Trail is also an access trail for those persons who hike the Cliff Nature Trail loop and who have not exited from the cave tour.

No Name Loop Trail

This is a one and one-tenths mile loop trail that starts and ends in the upper parking lot and meanders through an old-growth Douglas fir forest riparian zone. At about two-tenths of a mile from the Chateau, the trail splits, giving the visitor the opportunity to walk through the picnic area to the main parking lot via the No Name Connecting Trail. Continuing on, the trail splits again, providing access to the Cave Creek Trail. From this trail intersection with the Cave Creek Trail, the No Name Trail crosses Cave Creek over a wooden foot bridge, and climbs up along the south fork of Cave Creek to return to the upper parking lot. Nine-tenths mile of the trail is within the Monument and two-tenths of a mile are within the SNF. The trail is an easy hike between the Chateau and the picnic area and moderately strenuous on the return.

No Name Connecting Trail

This trail connects the No Name Loop Trail with the main parking lot, providing Monument visitors with an optional way back to their vehicles.

Picnic Trail

This short spur trail segment is used primarily for access to the Monument picnic area from the main parking lot. The trail includes a short, 50 foot trail that ties the picnic area to No Name Connecting Trail.

Cave Creek Trail

This trails branches off from the No Name Loop Trail below the Monument picnic area and proceeds a total of one and an eighth miles (one-way) from the Chateau through a portion of the SNF to the Cave Creek Campground. The many downed logs, moist stream environment and lush riparian ground cover make this trail different from the other trails in the Monument. White-tailed deer are common along this trail. Other wildlife that may be encountered include many birds, Townsend's chipmunks, golden-mantled ground squirrels, snowshoe hares, salamanders, newts, garter snakes, and rubber boas. This trail offers an opportunity to study aquatic life in the upper reaches of a key watershed.

Limestone Trail

Limestone Trail is situated at the southern portion of the Monument along the crest of mountains between Cave Creek and Limestone Creek watersheds, primarily in a thick stand of white and Douglas fir. Part of it goes through the serpentine soils at the southern end of the Monument before entering USFS land.

Buildings and Facilities

Thirteen buildings are located at the Monument, including the IVVC in Cave Junction, and at the administrative site. The maintenance shop, seasonal trailers, permanent residence, and quonset hut are located on USFS land located approximately one mile from the Monument. A total of four structures are currently on the NPS inventory at this site. One of these, the quonset hut, is totally inadequate for its present use by resource management, interpretation and fire and presents both health and safety hazards. Overall, space and facilities are inadequate.

Buildings Within the 480 Acre Monument Boundary

The first five buildings are listed on the National Register of Historic Places within the Oregon Caves Historic District. There are eight buildings total within the 480 acre Monument boundary. (See Cultural Environment section in this chapter for more detail on historic buildings.)

Chateau

This building is an historic five-story wood frame and log hotel with dining room, bar, meeting area and 22 guest rooms (28,261 square feet, includes area of six floors; total ground covered by building is 5,673 square feet). It is open daily from mid-June to early September, and operates as a limited bed and breakfast from September through November and March through May. It has an average occupancy rate of approximately 65% during the summer months and 23% during the shoulder season. A family dining restaurant and a coffee shop/lunch counter are open during the summer. A continental breakfast is offered during shoulder seasons. The Chateau is operated by a concessioner under an NPS contract.

Chalet

The Chalet is an historic two and one-half-story frame structure that includes, as its major functions, a gift shop, ticket sales for cave tours, and lodging for concession employees and NPS volunteers on a space available basis (10,391 square feet).

Guide Dormitory

This building is an historic two-story frame structure that provides housing for concession employees from May to September, but closed from October to April (2,624 square feet).

Ranger Residence

The Ranger Residence is an historic rustic one-story frame cabin that contains the resource management office, library, historical records, interpretive slide collections, a library/meeting room (1,050 square feet).

Checking and Comfort Station

This is an historic one-story masonry and frame building east of the main parking lot, open all year for visitor use, and also stores some interpretive materials (240 square feet).

Temporary Trailer for Administrative Offices

In the fall of 1997, a double-wide trailer was brought to the Monument to provide temporary office space for Monument staff to replace the Monument headquarters building which had been damaged by winter storms. This trailer was sited at the northern portion of the main parking lot.

Oregon Caves Company Storage Shed

The storage shed is a non-historic building used for concession employees' recreational equipment and general "catch all".

Water Treatment Building WS-62

This building houses the filtering, purification, and monitoring equipment that provides water to the visitor use areas.

NPS Tractor Shed

Buildings at the Administrative Site

There are a total of four buildings at the administrative site.

Residents' Quarters #5

This building is a one-story, three bedroom frame house used by a permanent employee. It is currently required occupancy for emergency medical and law enforcement staff.

Quonset Hut

The quonset hut (1,000 square feet) is used as a multi-purpose facility for storage of collections, Monument records, interpretive supplies, wildland fire truck and cache, EMS/SAR equipment and supplies. It also contains a washer, dryer and refrigerator for seasonal employee use. The building is a 1940's vintage, corrugated metal structure that is in a state of near total failure due to age, environmental conditions and heavy snow loading. It has no functional heating system and the electrical system is compromised by infiltration of water and rodent damage.

Maintenance Shop

The shop is a steel frame building (2,000 square feet) that provides space for carpentry, plumbing, vehicle repair, maintenance staff offices, tool and supply storage, and two restrooms. Two bays are used for parking equipment in the winter months. There is one open bay attached to the northwest side of the building which is used as a staging area for projects, and storage of materials.

Water Treatment Building WS-63

The water treatment building serves the residences, seasonal trailers, maintenance shop and quonset hut.

Building in Cave Junction

Illinois Valley Visitor Center

The IVVC is a modern one-story frame building located in Cave Junction on NPS property that contains the "off-site" information outlet for the Monument, SNF and the Illinois Valley area. It was built in 1991 and has 1,522 square feet.

Picnic Areas

There are three designated picnic areas. A nine-table picnic area is located on No Name Trail, which begins at the main parking lot. This site is frequently hidden by parked vehicles and is difficult to see. It was rehabilitated in 1993. The second picnic area is a small three-table site visible from the upper parking lot and receives the majority of use and is also accessible to visitors with disabilities. Two picnic tables are provided for public use at the IVVC in Cave Junction in an undeveloped lot at the back of the IVVC parking lot.

Utility Systems

Public Water System for Monument

The Monument's public water supply for visitor facilities is obtained from a surface water intake on Lake Creek about one mile northeast of the Monument at an elevation of approximately 4,400 feet on USFS land. Water flows by gravity from the intake, and is conveyed through a three-inch supply line for a distance of 8,100 feet to a treatment building where the water is filtered and continuously disinfected. Following filtration and chlorination, the water flows into two concrete holding tanks (37,800 gallons and 75,000 gallons, respectively). From there the water is conveyed to buildings and fire hydrants by an eight-inch cast iron distribution main. The systems currently meet all State of Oregon, Department of Environmental Quality and Public Health requirements. A state appropriative water right is on file for this system. Alternatively, these water uses might be supported by federal reserved water rights, though reserved rights for the Monument are presently undetermined.

Domestic Water System for Administrative Site

The non-public water supply for the administrative site is supplied by a small concrete spring box which collects water from a seep (on USFS land) and then conveys the water through a two-inch supply line to a 500 gallon concrete settling tank. The water then flows by gravity to a treatment building with filtration and continuous chlorination equipment, then stored in a 5,000-gallon concrete tank. The water treatment, monitoring, and reporting meet the requirements of the Surface Water Treatment Rule. The buildings and fire hydrants at the administrative site are served from this water storage tank through a six-inch distribution main line.

Additional studies are needed to ensure a long-term dependable water supply for the upgraded facilities proposed for the administrative site. The present collection system is adequate to meet the domestic needs of upgraded facilities, but the recharge time for fire suppression storage requirements may not be adequate. For additional water needed to increase the recharge time, a second spring box could be constructed to the east of the existing spring box to collect additional water which presently bypasses the collection system. Water conservation measures would be instituted to reduce the demand for water and associated costs of treating water and wastewater.

Public Water System for Illinois Valley Visitor Center

The water system for the IVVC is part of the public water system of the City of Cave Junction.

Wastewater System for Monument
The end result of drinking water use is the generation of wastewater. Wastewater is disposed of by vault and drainfield systems. Wastewater is collected from the Guide Dormitory, Chateau, and the Chalet public restrooms in four to six inch lines which flow into a manhole about 100 feet west of the Chateau. The six inch sewer main flows by gravity along the hillside approximately 700 feet to a 24,000 gallon capacity septic tank. The septic tank is divided into two compartments with a wall between that provides for most of the settling in the first compartment. Two sludge beds are located immediately to the north of the septic tank. The NPS contracts for the pumping of the sludge on about a 3-year cycle, with disposal to a wastewater treatment plant outside the Monument. Routine maintenance of the septic systems is necessary to keep the system in good operating condition. Septic systems require periodic pumping of tank sludge in order to maintain peak system efficiency and longevity. The Monument has a regular program of monitoring and pumping septic tank solids.

Wastewater System for Administrative Site
Existing domestic wastewater disposal for the administrative site includes four individual septic tanks and four drainfields for the residence, maintenance shop, quonset hut, and trailer hook-ups. Because the site is small, heavily vegetated, and has a steep topography, areas for locating an improved suitable wastewater collection and disposal method are limited.

Preliminary soils investigation and site analysis have found the abandoned tennis courts suitable for a drainfield area (and required replacement drainfield area), and the only relatively level site available. Wastewater effluent from individual septic tanks would flow by gravity to a pump station, and then would be pumped approximately 900 feet to the proposed drainfield area. This standard method of on-site treatment/disposal includes a series of infiltration trenches which allows the existing soil to effectively treat the wastewater. A survey would be conducted to accurately represent the siting and design of a conventional drainfield system developed in consultation with Oregon Department of Environmental Quality and applicable regulations.

Wastewater System for Illinois Valley Visitor Center
The wastewater system for the IVVC is provided by the Cave Junction public system.

Telephone System
The current telephone system is in poor condition. The existing telephone cable system is served by a 24 pair cable. Currently there are 18 lines (pair cable) that are out-of-service due to deterioration. The cable extends for five miles cross country from Grayback Campground. Only one mile of cable is buried. All outdoor public telephones were taken out of service in 1997 due to loss of lines. The line servicing Cave Creek Campground was taken out of service in 1996.

The Monument has purchased new 50 pair cable that is T-1 compatible. It will be installed along the road on the surface of the outside slope. Over the next 10-15 years a permanent long-term solution will be developed which could involve buried cable, microwave or satellite links for voice/data transmission. This same cable could be buried in the future if that is the most effective resolution. The concessioner is served by the Monument-owned lines and pays a monthly rental fee for their use.

The IVVC has two outdoor public pay phones. Inside the building there is one line for the Chamber of Commerce, one line/phone for the visitor center information desk, one for the USFS lines with the Federal Telephone System, and one line for a security system.

Electrical System
Electric power is supplied by Pacific Power and Light. Aerial lines bring the power to a location approximately nine miles from the Monument. From that point, underground cable is used. The reliability of this system has been good.

The IVVC is served by the City of Cave Junction's municipal utilities.

Concessions

Background

The first concessions contract at Oregon Caves National Monument was awarded by the USFS in 1923. Ten years later, the NPS assumed administration of the Monument, electing to maintain the concessioner's presence. The most recent authorization was conveyed on August 17, 1987. Services required under this contract include food and beverage service, lodging, cave guide tours, merchandise, and souvenirs. This contract expired December 31, 1996. The concessioner is currently operating on a one year interim letter of authorization.

The concessioner holds possessory interest (defined as the right to just compensation for the depreciated value of investment in, and improvements to, government owned facilities) in four structures used in their operations—the Chateau (lodge), Chalet (housing the gift shop and employee housing), a Guide Dormitory (housing), and a garage.

The main lodge building, known as the Chateau, was designated a NHL in 1987. In order to preserve the historic scene, buildings and lands associated with the Chateau have been designated a National Register historic district. As such, special care is required to maintain the historic character of these structures, and surroundings, and any proposed improvements or alterations are thoroughly analyzed by historical architects and other experts before approval is given.

Historical Perspective on Concession Operations
A brief history of concession activity dating from the earliest planning for development of Oregon Caves National Monument follows.

Chronology of Concession Developments
1922 The first development plan for the Monument was drafted, calling for development of a number of small cottages at the confluence of Grayback and Sucker creeks. Eventually the plan was amended to include concessioner responsibility for guide service operations, cave tour equipment, meals, and limited lodging. A bill was passed by Congress in September to transfer the land affected from the General Land Office to the USFS. This site was later occupied by Camp Oregon Caves from 1934 to 1941.

A tent camp and food service were provided at the cave under the first contract granted by the USFS. Two-person tents were available for $1.00 per night. The mess tent was on the present Chalet site. Carbide lamps (15 cents) and coveralls (35 cents) were also rented by the concession operator.

1930 The USFS attempted to recover some of the government's outlay for cave lighting and a water supply system by proposing that the company charge higher entrance fees and remit a portion back to the United States Treasury. The company objected to the proposal, arguing that these charges would increase their operating costs.

Oregon's Senator McNary opposed a proposal requiring the concessioner to maintain cave developments, and suggested instead that entrance fees be lowered so as not to allow the concessioner to "...profit unduly by reason of the outlays of federal funds." The concession manager, not particularly enthusiastic about the prospect of government pricing controls, requested the Portland Chamber of Commerce to intercede on the company's behalf at the Washington, D.C. level.

Meanwhile, the company requested a decision regarding their proposal to build a hotel at the head of the draw. The concession manager advised Senator McNary that company plans for building a $50,000 hotel would be held in abeyance if the company were forced to repay the Federal Government for a $35,000 cave lighting appropriation authorized by Congress in 1929.

1931 The concession authorization was renegotiated because the proposed hotel had been planned for a site outside of the leased area. The permit required that hotel construction be completed within three years. The new 20-year hotel permit charged the concessioner $100 a year and allowed the company to change the proposed site of the Lodge. A separate USFS special use permit authorizing the concessioner to furnish guide services remained in effect, but could be terminated unilaterally at any time by the agency.

Oregon Caves National Monument was transferred to the NPS. The first park ranger at Oregon Caves noted that "Everything connected with the Chateau is organized and under the management of Mr. Sabin (the concession manager)... Many powerful institutions are determined to keep it as it is."

1936 The USFS ruled that the concessioner would have to share that portion of its profits attributable to government activities at the Monument. On June 25, 1936, *The Oregonian* newspaper argued that the concessioner would operate at a loss if they had to pay 50% of their guide service profits to the government, as visitation and use of the Lodge had actually decreased during the depression.

Superintendent Canfield made a recommendation to the NPS director that the new concession contract not limit the operator to a five-year term. He pointed out that NPS could not run the guide service as cheaply or more efficiently than the concessioner, and although the government would make money by running the guide service, earlier compensable private investment rendered the idea untenable. The NPS subsequently negotiated a 15-year single contract with the concessioner that covered all its operations. The new contract effectively superseded all previous USFS permits pertaining to the Monument.

1946 The Oregon Caves Lodge (Chateau) resumed full operation on May 29, after a 5-year shut-down beginning with the onset of World War II. The company also made its first request for an increase in the cave tour guide service fee, asking that the rate be increased to $1.00 per person. The rate had previously remained at 50 cents per person since commercial cave tours were first offered in 1923.

1965 Rates for lodging rooms at the Chateau ranged from $6.50 for single rooms to $21.00 for suites. As a result of extensive flood damage to the Chalet and Chateau in 1964, the concessioner asked NPS for an extension of their contract.

1967 NPS agreed to change the franchise fee to 2.25% of all gross receipts, effectively reducing the total revenue being returned to the government in exchange for the business opportunity.

NPS launched a proposal to phase out overnight accommodations at the Monument, contending that concession operations would then reflect the day-use nature of the Monument by consolidating services within the Chateau. The Chalet, Guide Dormitory, Checking and Comfort Station, and former Monument headquarters building would have also been eliminated. The NPS Director Hartzog further proposed that all visitors be transported by bus from Cave Junction during the summer season to eliminate overcrowding of Monument parking facilities.

1968 A new NPS master plan proposed eliminating the Chalet and overnight use in the Chateau, and putting in another parking lot. The need for a park visitor center located in the nearby City of Cave Junction was stressed. However, the superintendent of Crater Lake National Park disagreed with more parking lots near the cave, expressing his belief that the Monument had reached its carrying capacity for automobiles.

1970 During peak summer visitation, the concession operator employed 85 to 100 people in its various commercial activities. Most were college students from all over the United States. There was strict division of jobs between males and females. Guides, maintenance, security, and the bar host were all males. Women were employed as waitresses, store employees, kitchen help, housekeepers, and nursery workers for children too young to go on the cave tour.

1976 Canteen Company of Oregon acquires all assets of previous concessioner, including possessory interest, at a purchase price of $500,000 in preparation for taking over the concession operation the following year.

1985 Lodge rates ranged from $39.00/night (single) to $44.00/night (double). Cave tour rates were set at $4.50 for adults and $2.50 for children. The Secretary of the Interior declared the Chateau an NHL.

1990 The new Illinois Valley Visitor Center in Cave Junction opened during the summer.

1991 NPS began more intensive oversight and auditing of cave tour operations. Audit scores of cave tours indicated improvement in accuracy but no improvement in interpretive techniques.

1994 The concession contract was amended to remove the requirement for child care service and reduce the franchise fee paid to the government from 5% to 2% of gross receipts in exchange for a reduction of one dollar less than comparability for adult fees in cave tour rates charged to the public.

1995 An NPS interdisciplinary team of Monument staff and the NPS Columbia Cascades Support Office staff in Seattle, Washington was created. The team reviewed concession operations and made recommendations for the type and level of services deemed appropriate for the Monument.

Current Status of Concession Operations and Other Visitor Services

At present, year-round commercial visitor services are provided at Oregon Caves National Monument. Like most units of the national park system, the vast majority of visitor use and commercial activity occurs during the summer months. Approximately 80% of the Monument's visitation occurs from June through October.

During peak summer visitation, a full range of visitor services is available from the concession operator, including lodging, gifts, food, and guided cave tours. These services are available to a lesser degree at other times of the year.

A cooperating nonprofit organization, the Crater Lake Natural History Association, sells interpretive materials at the IVVC. The marketing activity of this organization is restricted to items of an educational nature, which both fulfills its primary purpose and prevents a conflict with the concessioner's contractual right to sell other types of retail merchandise at the Monument.

NPS provides limited interpretation (day and evening programs in the developed area, Chateau, and USFS Grayback Campground), general information, and limited emergency response.

Although NPS certifies and monitors cave guides, the concession operator's staff actually conduct the cave tours. In addition, most facilities and activities in the park are managed by the concessioner, making it possible for many visitors to come and go from the Monument without ever seeing a NPS ranger or knowing that the Monument is an NPS unit.

A temporary trailer for administrative offices located in the main parking area and the nearby Checking and Comfort Station are the only NPS facilities available to the public. This information station provides limited storage space and room for one person. There is nothing to attract or invite the visitor to this structure other than the adjoining restrooms. Most visitors go directly to the cave area and the concession facilities.

The Chateau has an average occupancy rate of approximately 68% during the summer months and 28% during the shoulder seasons (1996 data). Support services such as kitchen and laundry facilities are capable of handling 100% guest occupancy. The concessioner also provides housing for its staff. Due to a recent increase in local area hiring, the Oregon Caves Company has experienced a surplus of rooms/beds.

Tours are given on a floating schedule and are limited to 16 persons. In the past, the guide service operated at maximum capacity, with six-minute intervals between tours, during peak afternoon periods in the summer. One to one and one-half hour backlogs for tours (up to two and one-half hours in 1997) occasionally developed as visitation exceeded the numbers allowed in the cave. During the off-season, the cave tours and the gift shop continue operating, along with minimal food service. Tours are offered a minimum of five times a day during the winter.

Services are significantly reduced during the off-season. During spring and fall (May 1-June 12 and Sept. 6-30), tours are scheduled between 9:00 a.m. and 5:00 p.m. Tours enter the cave whenever groups of 16 form or after one hour, whichever is later. The resultant waiting period is longer but requires a smaller number of scheduled guides. During the winter season (Oct. 1 - April 30) tours are scheduled six times a day. Food and lodging service is limited in the off-season but has been expanded somewhat since 1993. The Chateau operates as a bed and breakfast from September through November and March through May. The coffee shop has limited hours (usually 11:00 a.m. to 3:00 p.m.) from September through October and March through May.

Winter food service is limited to pre-packaged items which can be microwaved in the Chateau lobby. Cave tour registration operates out of the Chateau lobby during the off-season. During the winter, the NPS information station is closed, but the restrooms remain open. The temporary trailer, replacing the former

Monument headquarters building located in the main parking lot, is the only structure staffed by NPS personnel during the winter. As such, it also serves as the winter information station.

Concession Services

The following commercial visitor services are provided from either the Chateau (lodging, food service) or the Chalet (gifts, souvenirs, snacks, cave tour ticket sales).

Tours

Except for Christmas and Thanksgiving Day, concession staff guide cave tours for the public year-round with registration for tours starting from 8:00 a.m. to 8:30 a.m. and the last tour each day beginning from 4:00 p.m. to 7:00 p.m., depending on the season.

Food and Beverage Service

A coffee shop is open during most of the hours of cave tours during summer season. Hours are significantly reduced in shoulder seasons. Vending machines are available year-round, usually when other services are available. Winter food service is limited to items in a refrigerated case; the items may be microwaved in the Chateau lobby. Dining facilities and a separate lunch counter are available during the summer and sometimes on weekends during the shoulder seasons. A continental breakfast is offered to Chateau guests during shoulder seasons.

Lodging

The Oregon Caves Company operates a 22 room lodge at the Monument on a daily basis from mid-June to early September. The lodge is open with limited services as a bed and breakfast in September and October and in March, April, and May prior to the peak summer season. Except on limited occasions, rooms are usually available without reservations.

Merchandise, Souvenirs, and Handcrafts

A gift shop in the Chalet is maintained year-round, usually during times of the day when the above services are available.

Fees

Through the concession contract, the Federal Government obtains a franchise fee from the concessioner which constitutes a percentage of annual gross receipts. The percent of franchise fee income to the government can vary by contract based upon other contract particulars. Franchise fee income currently goes to the U.S. Treasury. The Monument and the NPS receive no direct income from franchise fees to offset expenses at the Monument. The NPS retains the right to charge a fee when NPS rangers provide a cave tour or other interpretive programs. To date, no such fee has been charged to the public.

Recreation Fee Demonstration Program

The NPS is participating in a three year program called the Recreation Fee Demonstration Program (Public Law 104-134 and amended by Public Law 104-208). The program allows 100 parks to retain generated income from fees (such as fees from cave tours) and to use them for their own park operation and maintenance. This is a pilot program which may become permanent in the future. The Monument is not currently participating in this program because no entry fee is charged by NPS for entering the Monument and cave tours are currently being provided by a concessioner under contract to the NPS. Revenue generated by the sale of cave tour tickets are kept by the concessioner for their operating expenses. However, the

Monument may apply to participate in this program in the future.

The Concession Contract

The latest concession contract, signed in August 1987, required the concessioner to undertake an investment program including replacement of the Chalet roof, upgrading the electrical system serving the Chateau, installation of a new fire sprinkler system in the Chalet, remodeling of the Chalet interior, and other building improvements. Those projects were completed during the original 10-year term of the authorization.

A 1994 amendment to the contract removed an earlier requirement for child care service. The concessioner requested this change because they were unable to meet state mandated child care requirements at the current revenue levels. The change was subsequently made in conjunction with an amendment to park regulations which removed the age restriction on children entering the cave and allowed the superintendent to instead set physical and performance requirements for cave entry.

With contract provisions recognizing 100% possessory interest in the Chateau, Chalet, Guide Dormitory, and garage building, the concessioner retains all rights and responsibilities of ownership except for legal title, which remains vested with the United States. This includes the right to just compensation for the depreciated value of the concessioner's investment in these structures. In the case of the Oregon Caves Company, their compensable interest in structures at the Monument was recently estimated at $825,000.00. Under past contracts, that amount would have to be paid in cash to the Oregon Caves Company, either by the Federal Government if the business operation were suspended by NPS for some reason, or by a new concessioner, in the event that the Oregon Caves Company didn't compete successfully with other offers for a contract renewal at some future date.

However, under a new provision of the recently revised standard NPS concession policy, possessory interest is "extinguished" frequently over a 30-year period, much in the same manner as the Internal Revenue Code allows depreciation of major assets over a long term. Using the Oregon Caves Company as an illustration, their possessory interest would be extinguished at the rate of 1/30th/year for each year they operate at the Monument, beginning on the effective date the next concession contract is executed. By the end of the 30-year period (or a lesser period if economically feasible), the concessioner's compensable interest would be zero. Cost of extinguishing possessory interest is offset against franchise fee payments.

It may also be possible to acquire the concessioner's possessory interest in meaningful increments, assuming no harm is done to the business operation and the concessioner agrees to the arrangement. For example, if possessory interest allocable to the Chalet building were set at $200,000, then, applying the above 1/30th/year, it would be possible for NPS to completely "buy out" the concessioner's compensable interest in that structure, and convert it wholly to NPS use in slightly more than seven years, without a direct outlay of funds. Or, the same result could be accomplished immediately through a $200,000 cash payment to the concessioner s for their compensable interest in the Chalet building. These approaches are discussed as possible strategies in several of the management alternatives for Oregon Caves examined in this GMP. This proposal would be subject to review for legal sufficiency by the Department's Office of the Solicitor.

The most recent concession contract expired December 31, 1996. The Oregon Caves Company operated in 1997 under a one-year interim letter of authorization from NPS. The GMP will examine a wide range of futures for Oregon Caves National Monument, including some significant changes in concession operations. Any new contract executed will reflect elements included in the final GMP.

The concessioner's contract with NPS spells out the legal relationship between the two entities in considerable detail, covering such elements as contract duration, required services, NPS oversight of rates charged to the public, accounting and financial reporting requirements, franchise fees, performance expectations, compensation for the concessioner's investment in government-owned buildings, property and liability insurance, and land assignments.

In addition, a separate maintenance agreement and operating plan are incorporated by reference into the main contract document. The maintenance agreement is a detailed outline that delineates maintenance tasks for which NPS and the concessioner are responsible for and include the following: interior and exterior painting; upkeep of electrical, water, plumbing, and heating systems; window replacement; structural repairs; grounds upkeep; roads and parking areas; floor and wall surfaces; appliance repair or replacement; snow removal; and other recurring tasks necessary to maintain an acceptable level of visitor service.

The operating plan is also very detailed in its coverage, but is oriented more toward the logistical aspects of visitor service, such as hours of operation, seasonal opening and closing dates, security, lost and found procedures, incident reporting, complaint handling, sanitation practices, safety, staffing, guide training requirements, advertising, rates for services, and lodging reservation procedures.

Both the maintenance agreement and operating plan are reviewed annually by NPS and the concessioner, and are updated and revised as needed.

Availability of Nearby Commercial Services

The nearest commercial cave tour is located at Lake Shasta Caverns, 209 miles by car from the Monument. Full service year-round dining, lodging, and gift shops are located 19 miles from the Monument in the City of Cave Junction. Summer dining establishments are available about 11 miles from the Monument. A full array of other visitor services are available in the City of Grants Pass, 50 miles from the Monument.

Clouded Salamander
(*Aneides ferreus*)

Environmental Consequences

Environmental Consequences

This section presents the analytic basis for the comparison of the alternatives described in the Alternatives chapter. It identifies the probable consequences, or the effects (impacts), of each alternative on selected environmental components. These components are derived from the issues that were identified during the scoping sessions and that are discussed in the Purpose and Need for the Plan chapter. As such, the environmental components collectively define the human environment relevant to Oregon Caves National Monument. The major categories of the issues include the following:

- Natural Resources
- Cultural Resources
- Scenic Resources
- Visitor Use/Interpretation
- Park Facilities/Staffing/Operations
- Socioeconomic Factors
- Boundary Adjustment/Land Protection
- Cumulative Impacts
- Unavoidable Adverse Impacts
- Short-Term Use vs. Long-Term Productivity
- Irreversible or Irretrievable Resource Commitments

Effects Common to All Alternatives

1) Cave resources—Visitor use would result in some degradation of cave resources in all the alternatives. Various studies show that disturbance by visitors and organics affect the distribution of macroinvertebrates, bats, wall bacteria, and speleothems; the degree of degradation would be mainly a function of group size and overall numbers.

2) Carrying capacity—Monument staff have examined the effects of tour size on cave resources in *Effects of Tour Size on Cave Resources at Oregon Caves*, by Roth and Knutson, September 28, 1996. That information was used to develop suitable carrying capacities as described in the various alternatives. Adherence to and frequent monitoring of the prescribed carrying capacity for cave visits would result in both resource protection and enhancement of the quality of the visitors' experience. These consequences also would follow from the completion of the trail rehabilitation project within the cave, which is anticipated under any alternative.

3) Rehabilitation of the cave trail—Short-term use versus long-term productivity for the rehabilitation of the cave trail would be manifested in a less than optimal experience for trail users during the reconstruction project, but ultimately, with the completion of the project, visitors would have a much improved cave experience. Similarly, the environmental conditions of the cave should improve over time with the completion of the trail rehabilitation project.

4) Threatened and endangered species—The NPS would not take any action under any alternative that would result in an adverse effect on resources of special concern such as sensitive species of plants and animals and

wetlands. The continuing collection of natural resource baseline data would contribute to a better understanding of the interrelationships of environmental components with the result that the Monument's natural resources would be better protected.

The northern spotted owl is the only federally listed species. One pair has constantly nested in the Monument within the same small area for the last seven years. Any action proposed by the NPS would take into account the birds' location and timing of nesting. The USFW would be consulted on any new actions that might affect the birds. Continued public use of Monument picnic areas would be expected to encourage higher populations of Stellar jays and a commensurate reduction in song bird and owl populations from corvid harassment.

5) Protection of the historic structures within the Oregon Caves Historic District—All cultural resources would be fully protected. Protection efforts would be enhanced to the extent permitted by staffing and budget levels. Any ground disturbance activity associated with proposed GMP activities would be preceded by archaeological investigations.

6) Irreversible or irretrievable resource commitments—This would include monies expended for Monument operations and administration, and the use of non-renewable materials and energy resources.

7) Prime or unique agricultural lands—In August 1980, the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on farmland soils classified by the United States Department of Agriculture's NRCS as prime or unique. Prime or unique farmland is defined as soil which particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to the NRCS, there are no prime or unique agricultural lands associated with the project area. The Monument does not administer the lands for agricultural purposes, and there is no potential for these lands to be categorized as agricultural lands of statewide importance. Therefore, because prime or unique agricultural land would not be adversely affected under any alternative, it is not analyzed further as an impact topic.

8) Fire management program—The fire management program for the Monument would allow fire to play a more natural role. Management for prescribed burns would reduce hazardous fuel loads within the Monument and lower the chances for an uncontrolled fire that might damage or destroy the Oregon Caves Historic District. Visitor safety would be enhanced by the reduction of fuels along the escape route on USFS Road 960 and 070 that serve as the alternative evacuation route for the Monument in the event that wildfire should close State Route 46.

9) Water conservation—Water conservation measures would continue to be taken at all facilities at Oregon Caves National Monument, as prescribed by NPS management policies. As visitation rates increase, water use rates would also increase. Water conservation practices, such as mitigating possible water distribution system leaks, low-flow shower heads, and low-flow flush toilets, would be explored and in place prior to increased future demands. In addition, as water conservation measures are implemented, not only would the withdrawal from Lake Creek be reduced—providing better habitat for the aquatic community downstream from the intake—but water treatment costs should also decrease.

Alternative A—No Action Alternative

Alternative A is the "No Action Alternative" which means a continuation of the present course of action, or maintenance of the status quo of existing policies and programs.

Effects on Natural Resources Under Alternative A

Over two-thirds of the cave tour would continue to be exposed to unsupervised visitors, resulting in a high potential for damage to speleothems (for example., touching and breaking formations, graffiti). Large tours would likely continue to disturb populations of Townsend's big-eared bats during winter between the main entrance and the 110 Exit. Within the last decade the overall bat population in the cave has undergone a substantial reduction even though bat use inside the first two main cave entrances has increased during winter. Since large tours and perhaps lights appear to cause bats to move from their preferred roosting sites at Oregon Caves, bats would continue to be impacted.

Increased surface run-off and sedimentation resulting from SNF logged areas adjacent to the Monument could enter the watershed system of the cave and possibly alter its ecology. The potable water supply for the Monument could be contaminated due to unrestricted livestock access from the RRNF to Bigelow Lakes and the upper Lake Creek watershed which lies outside present boundaries of the Monument. The Monument`s air quality is affected by exhaust emissions from vehicles within and adjacent to the Monument and by activities that produce dust and smoke, such as timber harvest and slash burning on adjacent USFS lands. Declines of fringed, long-eared, and long-legged myotis bat and the pallid bat may be from loss of old-growth forest and riparian areas outside the Monument.

Planting of trees and seeds in surrounding clearcut areas on SNF may include seed or nursery stock collected in areas outside of the Klamath ecosystem. Cross pollination of this stock with old growth stands inside of the Monument boundaries may strongly impact the genetic integrity of future forests in the Oregon Caves watershed.

The No Action Alternative would not provide protection from potentially harmful land use activities to a large portion of Applegate marble that lies north of the Monument boundary and is continuous with the marble within the Monument. The potential for undiscovered caves is high. Protection of the marble from regional land uses such as logging, grazing and mining could reduce alteration of the natural system. For example, if the amount of precipitation (such as runoff) is increased, water may flow through the cave, act at a faster rate and be more chemically aggressive (undersaturated), thus dissolving speleothems.

In addition, there would be limited protection to the adjacent watersheds containing karst geology that lie outside the existing Monument boundary. Many karst areas throughout the world, including NPS karst lands, are affected by development and associated pollutants. The vast majority of the Monument is in old-growth forest but the surface forest ecosystem of the lands surrounding the Monument have been radically altered by logging. Karst aquifers are noted for extremely oxygen-rich, but nutrient-poor streams. Diffuse autogenic (locally derived) recharge, working its way down through narrow fractures into the caves, supplies little organic matter into the cave. As the streams in Oregon Caves naturally contain extremely low amounts of organic debris, any existing aquatic communities may be vulnerable to eutrophication brought about by even moderate change in watershed land use.

The Monument's forest ecosystem is regionally and nationally significant and lies within a forest region perhaps more diverse and complex than any other in the West. However, the Monument's forest types are not well represented elsewhere in preserve status. The No Action Alternative would not provide any additional protection for this resource.

Conclusions

Unsupervised visitors on much of the cave tour would continue to pose potential threats to the integrity of cave formations; large tours would likely continue to disturb Townsend's big-eared bat populations in the cave during the winter. Declines of fringed, long-eared, and long-legged myotis bat, and the pallid bat may continue due to loss of old-growth and riparian areas outside the Monument. Continuation of existing SNF land use practices, such as timber harvesting and livestock grazing on adjacent lands, could lead to degraded water quality of both the potable water system within the Monument and of the cave ecosystem and associated aquatic communities. The Monument's air quality is affected by vehicular exhaust emissions and by logging and slash removal on adjacent lands. No protection would be provided to the adjacent watersheds containing karst geology or the extended Applegate Marble outside the Monument boundary, or the unique forest types and vegetation.

Effects on Cultural Resources Under Alternative A

While attempts would continue to protect all cultural resources, retention of the presently inadequate collection storage facility at the quonset hut could leave those resources in jeopardy. Maintaining the quonset hut for continued collection storage would require extensive rehabilitation at great expense. There is also a risk of inappropriate maintenance by untrained staff. Portions of the Monument collections have been relocated to Crater Lake National Park, therefore the accessibility of some objects for research and interpretive purposes present problems due to distance factors.

Conclusions

Due to an inadequate storage facility, some collections materials could be subject to loss or damage and the full potential uses of those resources would not be realized. Maintaining the quonset hut for continued use would require extensive rehabilitation at great expense.

Effects on Scenic Resources Under Alternative A

For those visitors expecting to see extensive, intact forest ecosystems, the experience likely would be somewhat disappointing. Visitors would continue to observe clearcut areas in foreground and middleground views of lands outside the Monument boundary from viewpoints within the Monument, and on adjacent trails. Reforestation efforts have been difficult and unsuccessful in many of the clearcuts due to the high elevation, steep slopes and types of soil found in the area. Though most of the area surrounding the Monument is presently in LSR status, timber harvesting in the form of salvage, thinning activities, cutting of large trees to reduce fire hazard, and associated road building could continue to occur.

Conclusions

The proximity of clearcut areas to the Monument would continue to detract from the scenic quality of views from the Monument. The potential for an enhanced visitor experience would not be expected to improve due to degradation of the scenic quality over the long-term.

Effects on Visitor Use/Interpretation Under Alternative A

The visitor experience likely would be satisfactory for those who expect to find in-park lodging, gift shops, and full food services during their visit, but could be less so for those visitors who believe the array of such services is better located outside the Monument. Similarly, for those who expect to see NPS rangers conducting cave tours and other interpretive functions, the experience could be diminished due to present staffing levels which do not permit that level of NPS presence. Visitors would not be provided on-site orientation or receive information about the cave or other resources of the Monument other than what they obtain from the IVVC in Cave Junction, provided they stop there. With no provision for making reservations for cave tours, visitors could experience crowded conditions and unanticipated long waits to enter the cave during periods of high use.

Daytime interpretive programs provided by park staff are weather dependent given their outdoor location. These programs are presented in an environment where adjacent automobile traffic on the drive, cave tour ticket sales, and visitor queuing for the next cave tour compete for visitor attention. Evening programs must be given within a lodge environment where other competing activities occur such as registration desk check-in and lodge guests walking through the area to gain access to their rooms, thus detracting from the interpretive programming being presented.

Continuing the public vehicular access to the upper parking lot would pose an on-going potential safety hazard for pedestrians along the narrow road that connects the upper and main parking lots.

Conclusions

The current food/lodging/gift sales services and facilities and concession-run cave tours could be viewed by the visitor as positive or negative factors, depending on visitor expectations. Congestion and lengthy delays in entering the cave due to the absence of a reservation system could detract from the visitors' experience. Vehicular access to the upper parking lot would continue to present potential safety hazards for pedestrians along the road that connects the upper and main parking lots.

Effects on Park Facilities/Staffing/Operations Under Alternative A

Because the basic interpretation of the cave would be conducted by concession employees, implementation of this alternative would fail to meet NPS-6 guidelines and management policies regarding NPS basic and essential interpretive operations. Due to recent landsliding, the Monument headquarters building would be vacated and removed. Staff and administrative offices would be relocated to a temporary trailer in the main parking lot. Storage facilities for collection resources and interpretive materials would continue to be inadequate. These conditions would continue to limit the full potential of the staff's ability to protect physical and cultural resources and serve the public. The small number of NPS employees would limit the ability of the staff to monitor all work standards for the concessioner; failure to ensure compliance could result in possible resource degradation and a lower quality of visitor experience.

Conclusions

Because most interpretive programs would be offered by the concessioner, this alternative would fail to meet NPS guidelines and management policies regarding basic and essential interpretive operations. Inadequate office and storage space, and the small number of NPS staff would continue to limit the full potential of the staff's efficiency and effectiveness in dealing with resource protection and visitor use.

Effects on Socioeconomic Factors Under Alternative A

Based upon results achieved by applying the IMPLAN economic impact modeling procedure as developed by the USFS, under the No Action Alternative, a total of 198 jobs in the Illinois Valley area can be directly or indirectly attributed to the impact of current operations at the Monument. This includes the impact of total visitation, NPS and concession staff salaries, and NPS and concession purchases of goods and services. Current conditions result in a combined annual wholesale and retail sales benefit to area tourism of some $6,688,000 in goods and services purchased, and a combined tax benefit to the State of Oregon and local communities of $180,000 per year.

As a breakdown of these statistics in the area of economic benefits resulting from park visitor expenditures, 123 jobs can be attributed to tourism based upon 32,000 recreation visitor days to the Monument. A total of $110,000 of tax revenue is realized from a total of $4,100,000 of both direct and indirect sales benefit in the purchase of goods and services. As related to the economic benefit from Federal Government expenditures for park related activities, 30 jobs, tax revenues of some $29,000, and $1,100,000 sales of goods and services can be attributed to government expenditures by the NPS at the Monument. Regarding the economic benefit resulting from both direct and indirect park-related expenditures by the concessioner, some 45 jobs, $40,000 in tax revenue, and $1,500,000 in sales of goods and services can be attributed to concession operations at the Monument under this alternative.

Low Income/Minority Populations

The concessioner currently employs people in a county with a median income level that is below the state average and with a small minority population. Maintenance of existing conditions would not be expected to affect these population segments.

Conclusion

Low income/minority populations would not be affected.

Effects of Boundary Adjustment/Land Protection Under Alternative A

Current boundaries would be retained and management of the Monument would continue as present. Logging, grazing, and other multiple use practices in compliance with the approved *Siskiyou National Forest Land and Resource Management Plan* would continue on the adjacent SNF. Some of these practices, notably timber harvesting and livestock grazing, would continue to pose potential threats to water quality within the Monument. Logging operations on lands outside, but visible from the Monument would detract from the quality of experience for some visitors.

Conclusions

Some land use practices on adjacent SNF lands would continue to pose potential threats to water quality within the Monument. Continuing timber harvest on SNF lands visible from the Monument would detract from the quality of experience for some Monument visitors.

Cumulative Impacts Under Alternative A

Since its establishment, the Monument has provided for the protection of cave resources and forested lands within its boundaries, while allowing non-consumptive use of those resources by visitors. The adjacent USFS lands have been and are managed to meet multiple use objectives which include extractive activities such as logging.

Past overcutting of old-growth forests on federal lands throughout the Pacific Northwest has raised serious concerns about the long-term viability of that unique habitat and eventually led to adoption of the *Northwest Forest Plan*, which identified areas to be managed for the preservation and enhancement of forests with old-growth characteristics (with LSRs being the largest single management category established by the *Northwest Forest Plan*). The Monument's natural resources would both contribute to and benefit from the realization of that plan's goals. Although the Monument's forested lands are relatively small in area, their quality and characteristics nonetheless would contribute to and support the values associated with old-growth forests in the larger ecoregion. Similarly, in the future, if the remaining old-growth forests on the SNF are successfully protected and enhanced, those resources would contribute to the restoration of the forest ecosystem of which the Monument is a small part.

A forest environment, with restored habitat diversity, for example, should improve fish and wildlife resources throughout the region, including the Monument. Visitors to both the Monument and the larger region with expectations of seeing extensive tracts of old-growth forests would not be disappointed. However, this expected outcome would be realized subject to continued implementation of the *Northwest Forest Plan* and *Siskiyou National Forest Land and Resource Management Plan* that are consistent with the intent of the *Northwest Forest Plan*. Because all of these plans are products of the executive branch of the Federal Government, and the specific details of their implementation not required by federal law, it is possible that they could be altered or discarded under future administrations without the necessity of congressional action. If present national forest LRMPs would change to permit timber harvest or other activities to the detriment of old-growth enhancement, then the resource values associated with old-growth forests that would have accrued to the Monument, including the quality of visitors' experience, would be diminished.

Even if LSRs are maintained, thinning, salvage activities, and cutting of large trees to reduce fire hazard are allowed in LSRs under the provisions of the *Northwest Forest Plan*. These activities are considered full-scale logging operations with many long term effects, such as increased fragmentation, windthrow, micro-climate changes, increased access from logging road construction, and impacts to wildlife habitat. Salvage operations remove significant number of snags that are important to many species of arthropods, fungi, and snag-dependent birds. Snag maintenance requirements are not mandated for LSRs in the *Northwest Forest Plan* (Anderson 1996: p.41).

Construction of fuelbreaks could increase habitat fragmentation and pose increased threat to species that require forest interior habitat. The use of chain saws and other equipment for purposes of fire-reduction could actually increase the risk of fire. In addition, the need to maintain or increase road access in LSRs to conduct silvicultural activities would prevent decommissioning of roads necessary to restore watersheds and meet the objectives of the Aquatic Conservation Strategy in the *Northwest Forest Plan*.

Unavoidable Adverse Impacts Under Alternative A

In the absence of a suitable storage facility, the potential loss of some collection resources would continue as a threat. The removal of collections to Crater Lake National Park would result in a lack of access by Monument staff for research purposes.

Short-Term Use vs. Long-Term Productivity Under Alternative A

Under the existing arrangement for provision of public cave tours, none of the fees charged visitors are used to directly support any operations at the Monument. Therefore, revenues do not offset operating costs on either a short or long-term basis. Nevertheless, significant federal funding is committed on an annual basis to support the contractor providing these tours. Support is provided through restoration, reconstruction and maintenance of the cave trail and lighting system. Rehabilitation, planning and construction costs in this area have totaled over $1.2 million dollars since the inception of the most recent project. Non-reimbursed indirect support is also provided through construction, maintenance and upgrade of infrastructure facilities used by visitors taking the cave tour such as roads, trails and parking lots. Other indirect costs not supported by cave tour fees include visitor protection services (law enforcement and emergency medical) and informational and educational services about the cave and associated resources (newspaper, brochures, exhibits and displays.)

Contracting of cave tours results in reduced park staffing levels within the division of interpretation. This increases the burden on the limited staff who are required to provide oversight of contracted employees in addition to accomplishing overall NPS mission goals in the same manner as units with full staffing. Under this alternative, over the long term there would be no NPS seasonal or subject to furlough employees assigned to cave tours. Therefore, this supplemental staffing would be unavailable to complete work in other mission critical areas such as environmental education/outreach, staffing of visitor orientation and information center, program planning, and development of publications, exhibits and displays.

Irreversible or Irretrievable Resource Commitments Under Alternative A

None beyond those identified above as common to all alternatives.

Alternative B—Minimum Requirements Alternative

Alternative B is the "Minimum Requirements Alternative" and describes those minimum actions, consistent with the purpose of the park, that are required for the safe and effective operation of the park and protection of park resources.

Effects on Natural Resources Under Alternative B

Within the protected area, the USFS would be requested to place restrictions on certain logging activities and additional road building, with prohibitions placed on grazing. This area would also be withdrawn and closed to mineral entry, including mineral leasing, but subject to valid existing rights. Cattle grazing would be eliminated with the result that water quality and riparian vegetation would improve, and erosion and sedimentation around and in streams would be prevented. Cave ecosystems could be enhanced and better protected as a result.

With substantial reduction in timber harvesting due to compliance with Full Retention Visual guidelines in the upper Cave Creek and Lake Creek watersheds, there would be a reduction of sediment in adjacent streams, less soil erosion and runoff, and less impacts to water quality for potable use and habitat than in Alternative A. Edge effects from logging would be reduced around the Monument including potential windthrow, increased shrub density and changes in relative humidity and temperature. (Effects on microclimate and herbaceous species like trilliums may extend up to 500 feet into the Monument from adjacent clearcuts, especially in areas down from the prevailing winds.) However, since Port Orford cedar root rot is primarily spread by logging equipment and vehicles, potential infection spread is possible to remaining Port Orford cedars in the adjacent watersheds.

There would be less timber slash than in Alternative A within the watersheds surrounding the Monument to impact roads and streams during periods of high rain and snowfall, lessening the chance of potential bridge washouts, landslides and debris flows. Large scale reforestation, which is difficult in this area due to soil type, rainfall, and elevation, would not be necessary within the protected area (except in existing clearcuts) since timber harvesting would be restricted. However, smaller scale reforestation may still be necessary. Previously cut-over areas gradually would assume natural forest conditions with the attendant benefits of greater ecological diversity. Cave ecosystems could be enhanced and better protected as a result. Declines of the fringed, long-eared, and long-legged myotis bat and the pallid bat, which may be from loss of old-growth forest and riparian areas outside the Monument, could stabilize or improve.

Inclusion of the protected area includes a small addition of serpentine soils on the southwest border of the Monument's boundary. This would give some protection to the unique plants that are confined to this soil type by limiting activities such as timber and mining activities within the vicinity.

Alternative B could provide some degree of protection to a large portion of Applegate marble that lies north of the Monument boundary and is continuous with the marble within the Monument by limiting land use activities that could affect the water quality. The potential for undiscovered caves is high. Protection of the marble from regional land uses such as logging, grazing and mining can reduce alteration of the natural system. For example, if the amount of precipitation in the form of runoff is increased, water may flow through the cave at a faster rate and be more chemically aggressive (undersaturated), thus dissolving speleothems. However, even small scale logging operations allowed in Alternative B could change the natural water flow and could potentially affect the underlying water system of the marble.

In addition, Alternative B could provide some degree of protection to the watersheds containing karst geology. Many karst areas throughout the world, including NPS karst lands, are affected by development and associated pollutants. The vast majority of the Monument is in old-growth forest. Addition of lands adjacent to the Monument into the protected area could protect the surface forest ecosystem by reducing certain incompatible land uses. Since reduced timber harvest would be allowed in the upper Cave creek watershed, there could be an affect on the underlying and adjacent watersheds containing karst geology thereby affecting the cave resources

The Monument's forest ecosystem is regionally and nationally significant and lies within a forest region perhaps more diverse and complex than any other in the West. In addition, the Monument's forest types are not well represented elsewhere in preserve status. Alternative B would provide additional protection for this resource by limiting incompatible land uses.

Use of an employee shuttle van system would help control vehicular congestion to and from the Monument and within its developed areas; improved air quality due to fewer auto exhaust emissions would likely be one result. Air quality would probably improve also due to the cessation of dust and smoke-producing activities associated with timber harvest that occurred prior to including those lands within the protected area.

The caves would be open for public touring from mid-March to early December of each year. The three and one-half month period when the caves are closed to the public would provide for periods of extended darkness to help restore natural conditions in the cave and provide an opportunity for necessary cave trail maintenance. Within the last decade the overall bat population in the cave has undergone a substantial reduction even though the use inside the first two main cave entrances has increased during winter. Since large tours and perhaps lights appear to cause bats to move from their preferred roosting sites at Oregon Caves, closure of the tour route to such effects is likely to offset the overall bat decline. Evaluating whether human effects on invertebrates in the cave are significant is best done by studying populations in both space and time. This can only be done by closing a part of the tour route for substantial periods of time, even if such a closure does not restore populations to a prehistoric distribution.

Greater NPS control over the size, duration, timing and guiding of cave tours would likely result in the reduction of human-caused organics, desiccation, and temperature changes from lights and vandalism. The reduced organics and lights likely would allow some recovery of the invertebrates near the trail.

Conclusions

The Monument's water quality and ecological diversity would be improved by substantial reduction of adjacent land use activities. Protection of the cave ecosystems and associated aquatic communities would be enhanced. Elimination of USFS timber harvesting and livestock access in the upper watershed surrounding the Monument would protect the Monument from increased surface run-off, sedimentation, and reduce threats of contamination to the public drinking water supply. Declines of fringed, long-eared, and long-legged myotis bat and the pallid bat may improve. Also, some degree of protection would be provided to the watersheds containing karst geology, and to the extended Applegate Marble outside the Monument boundary within the protected area by a reduction of certain land use activities. Air quality likely would be improved through use of an employee shuttle van system and the reduction of timber harvest on lands included in the protected area. Closure of the caves from public tours for three and one-half months would provide a period of rest for cave resources and would benefit the resident and migratory bat population of the area, including the Townsend's big-eared bat.

Effects on Cultural Resources Under Alternative B

All concession services would be suspended, and possessory interest in all of the Monument's buildings would be acquired from the concessioner. The Chalet would retain its historic exterior appearance, but would be utilized as a visitor center.

The NHL Chateau's original use as a hotel would be discontinued, and it would be adaptively reused as Monument administrative offices. Its adaptive reuse as park offices, with associated use of computers, telephones, and other communications technologies, would require a greater demand for electrical energy which would likely require certain alterations and modifications to the historic fabric within the structure to accommodate these uses. While such modification would be kept to only those minimum changes that are needed, significant alteration and associated impact on the existing historic fabric would still be anticipated.

The Guide Dormitory and upper level of the Chalet would be retained for general Monument administrative use. The historic Checking and Comfort Station adjacent to the main parking lot would be preserved. The historic Ranger Residence would continue to be used for natural resource staff offices. The deteriorated and inadequate quonset hut, which is currently used for collections storage, would be removed. Collections storage would be moved to the Chateau to provide adequate storage for those resources. A study would be initiated to determine whether the Chateau could accommodate the climate controlled environment necessary for collections.

Conclusions

While adaptive reuse of the Chateau would retain the historic character and preserve the exterior appearance of the buildings, significant alteration and associated impacts on the existing historic fabric would be anticipated. Adapting the lower level of the Chalet for a visitor center would provide visitors the opportunity for enhanced interpretive and educational experiences. The public would continue to have access to the lobby and lower level of the Chateau to view its historic interior features, but no longer have the opportunity to spend the night in a unique historic hotel. Storage for the Monument's collections at the Chateau would enhance the potential for long-term preservation of those resources and their use in interpretive and resource management programs.

Effects on Scenic Resources Under Alternative B

Though visitors would continue to observe clearcut areas in foreground and middleground views from viewpoints within the Monument and on adjacent trails in the near-term, future scenic views would be protected with the addition of a protected area. While the boundary of the Monument itself would not change under Alternative B, designation of a 3,310 acre protected area within the adjacent SNF would be managed under USFS guidelines for full visual retention with restrictions placed on certain logging activities and additional road building, and prohibitions placed on grazing and mining. This would provide improved scenic vistas over time from viewpoints within the Monument. The foreground and portions of the middleground viewsheds from the Monument would also be protected by preserving the natural setting.

Conclusions

The potential for an enhanced visitor experience would increase due to improved scenic quality over the long-term.

Effects on Visitor Use/Interpretation Under Alternative B

An on-site visitor center located in the lower level of the Chalet, including static, self-guided exhibits and multimedia presentations, would provide visitors with an improved opportunity for obtaining basic information about the Monument and interpretation of Monument resources and programs.

The IVVC in Cave Junction would provide enhanced information and orientation services for visitors to assist in making their decisions before they drive the 20 miles to the Monument. Cave tours would be scheduled, with tickets for a particular tour time, and sold in advance at the IVVC or at the visitor center in the Chalet, enabling visitors to purchase their cave tour tickets and plan their day's activities around the scheduled time. Tours would be operated by the NPS with direct supervisory control over cave guides, and directly meet NPS interpretive objectives. The tours would be conducted by NPS rangers and would be limited to 14 people per tour group. This would enable visitors to enjoy a ranger-led tour of the cave resource in a smaller group. Reduced group size would allow for better interaction with the guide.

With a defined carrying capacity below current use levels, some visitors during peak demand periods would be unable to take a tour at a specific time or date. This would result in some dissatisfaction with visitors who are unwilling or unable to remain to take a later tour or a tour offered on the following day.

There would be limited parking at the Monument under Alternative B, and shuttle service from Cave Junction would not be provided, except for employees. This could result in congestion and problems for visitors trying to park their cars on heavy visitation days. It is expected that the installation of scheduled tours, with a reservation system, and advance ticket sales at the IVVC in Cave Junction, would decrease the total number of cars that travel to the Monument and stay parked there for several hours. Fewer vehicles within the Monument and their general restriction from the National Register historic district would create a safer environment by reducing the potential for pedestrian-vehicular conflicts. Parking spaces for persons with disabilities, staff, and official government cars would be provided. Parking lot usage would be monitored, and if space capacities are reached on a continuing basis, alternative strategies to accommodate visitors would be pursued.

Fees obtained for cave tours would be returned to the Monument for the direct benefit of the public use of the caves.

Alternative B calls for the caves to be closed to the public from early December to mid-March each year. This could cause a problem for some visitors who would want to tour the caves during those months. Monument records indicate that visitation during that period has historically been very low because of poor weather and road conditions, so relatively few visitors would likely be affected.

The main floor lobby and lower level coffee shop and dining area of the Chateau would be preserved in their original historic condition and be accessible to the public, so visitors could have an opportunity to view the historic interior of the lodge.

The removal of full food service and lodging at the Monument could decrease enjoyment of the experience for some visitors. However, commercial lodging facilities are provided in Cave Junction, and vending machines would be installed so visitors could enjoy a snack or beverage.

The loss of the gift shop could be a negative impact for some visitors who enjoy purchasing souvenirs. However, the inclusion of a small area for a cooperating association to sell books, pins and similar small items would allow visitors to make some purchases if they chose.

All above-ground utility lines would be buried which would enhance maintenance, visitor safety and aesthetics. The routine maintenance of cutting and clearing vegetation around power lines would not be necessary. The visual intrusion of power lines in an historic setting would be removed.

The designation of a 3,310 acre protected area adjacent to the Monument to include the upper portions of the Cave Creek and Lake Creek watersheds above and adjacent to the caves would prohibit forest timber harvesting and grazing in the watershed which provides the Monument's water supply. This would improve protection of the drinking water supply for the public and Monument employees. This also would provide improved scenic vistas over time from viewpoints within the Monument.

The USFS would continue to be able to collect fees for trail use.

Conclusions

Visitors would receive information and orientation to the Monument in a more convenient way with an on-site visitor center. The ability to schedule cave tours and purchase tickets in advance at the IVVC would enhance the visitor experience by providing more flexibility in their personal activity scheduling and would remove the necessity of driving up to the Monument early and waiting for long periods of time to take the tour. Cave tours operated by the NPS would allow better opportunity to provide visitors an interpretive experience that meets NPS standards.

Designation of a 3,310 acre protected area within the adjacent SNF surrounding the caves should provide a more enjoyable experience for visitors who wish to see extensive, intact forest ecosystems. Removal of food service, lodging, and gifts sales would likely diminish the experience for some visitors who would enjoy spending a longer period of time at the Monument. However, since most visitors would be cycling in and out of the Monument in conjunction with scheduled tours, the loss of those services would not likely affect as many visitors as under the existing conditions.

There would be limited parking at the Monument under Alternative B, and a public shuttle service from Cave Junction would not be provided, except for employees. This could result in congestion and problems for visitors trying to park their cars on heavy visitation days. It is expected that the installation of scheduled tours, with a reservation system and advance ticket sales at the IVVC in Cave Junction, would decrease the total number of cars that travel up to the Monument and stay parked there for several hours. Parking spaces for persons with disabilities, staff, and official government cars would be provided. Parking lot usage would be monitored, and if space capacities are reached on a continuing basis, alternative strategies to accommodate visitors would be pursued.

The three and one-half month closure of the caves for public touring would occur at a time when visitation is traditionally low because of poor weather and road conditions. Those visitors who do visit the Monument would have their experience diminished by the closure of the caves and the lack of concession services.

Effects on Park Facilities/Staffing/Operations Under Alternative B

Office space for NPS staff and collections storage would be improved by moving into more spacious quarters in the Chateau. Adaptively reusing the Chateau could have detrimental impact on the historic building and result in less efficient designed office space. An on-site visitor center would enhance NPS staff's ability to interact with the public and meet mission goals and objectives.

Additional staff would be required because of the increased emphasis on education and NPS guided cave tours.

Conclusions

Moving administrative offices and collections storage into the Chateau would improve efficiency of staff operations and their ability to effectively protect Monument resources and interact with the public. Changes to the Chateau to accommodate the new use may have detrimental impacts on the historic building. Fewer alterations to the historic fabric could result in less efficient designed office space.

Effects on Socioeconomic Factors Under Alternative B

Implementation of Alternative B results in positive economic benefit to the economy of the area, and is comparable with the economic benefit derived from Alternative A, but less than that derived from either Alternatives C or D. Economic benefits from park visitor expenditures would be expected to be consistent with the other three alternatives, and the economic benefits from Federal Government expenditures for the purchase of goods and services would be higher than the No Action Alternative. The cooperating association sales outlet in the proposed visitor center would result in the hiring of employees and purchases of goods and services, providing some economic benefit to the area. Also, an increased benefit over the No Action Alternative would result from Federal Government expenditures for park related activities due to increased staffing levels to conduct cave tours and to provide staff to operate and maintain the visitor center. These benefits would be somewhat offset by reductions in economic benefit from non-federal expenditures compared to the other three alternatives. This is because except for the cooperating association sales outlet and a few vending machines, no lodging, food service or gift sales to Monument visitors would be provided under this alternative.

The net result is that under Alternative B, a total of 188 jobs in the Illinois Valley area can be directly or indirectly attributed to the impact of implementing the various provisions of Alternative B. This includes the impact of total visitation, NPS and cooperating association staff salaries, and NPS and cooperating association purchases of goods and services. Compared with Alternative A, more jobs are created due to the direct and indirect effect of government employment and related expenditures, and fewer jobs due to reduced non-federal expenditures. These factors would result in an estimated combined annual wholesale and retail sales benefit to area tourism of some $6,552,000 in goods and services purchased, and a combined tax benefit to the State of Oregon and local communities of some $176,000. These figures are comparable, and slightly reduced from those attributable the estimates provided for the Alternative A.

Timber Sales

Josephine County receives payments from the state derived from federal payments for a percentage of revenues generated on the SNF, primarily from timber receipts. By reclassifying 3,310 acres of land as highly restrictive for harvest as proposed under Alternative B, a corresponding reduction in payment to the county would be anticipated. However, with the prior establishment of the LSR within SNF by the *Northwest Forest Plan* (LSRs are excluded from national forests general timber quota), timber harvest has been greatly reduced for these lands. An exception are the timber sales made prior to the establishment of the LSR. Cutting and resultant county revenues generated by these existing sales would not be changed or affected by Alternative B.

Payments made to the county as a result of Public Law 103-66, commonly referred to as the "owl guarantee," would not be changed or affected under Alternative B. Payments in lieu of taxes made to the county for qualified federal resource lands, otherwise known as "entitlement lands," would also remain unchanged for Alternative B.

Tourism
An increase in tourist revenues generated by an new on-site visitor center, enhanced visitor facilities, and increased recreational activities may be realized by the local economy.

Low Income/Minority Populations
The concessioner currently employs people in a county with a median income level that is below the state average and with a small minority population.

Replacing concessioner cave tours guides with NPS staff would provide a positive improvement for low income population segments in Josephine County. The NPS invests a large part of its budget in its staff in the form of specialized training and higher wages. The NPS also offers better career opportunities and sustains a goal of increasing ethnic diversity in the workplace which means there would be more effort to employ minority segments of the community in Josephine County.

Conclusions
Low income/minority populations would not be expected to be negatively impacted.

Due to restrictions already in place for LSRs, Josephine County would not be negatively impacted by timber sales revenue.

Effects of Boundary Adjustment/Land Protection Under Alternative B

Current boundaries would be retained and management of the Monument would continue as present. A protected area of 3,310 acres would be established within the adjacent SNF. This land would be managed under USFS guidelines for Full Retention Visual. Full Retention Visual guidelines require that management activities be conducted in such a way that they are completely subordinate to the natural character of the landscape and are not distinguishable to the casual observer. In addition, the NPS would allow for a natural ecological succession to a climax ecosystem. This would result in no harvesting of over 20% of base area based upon a predetermined base year. Timber harvest activities would be review by Monument staff. The USFS would be requested to place restrictions on certain incompatible logging activities and additional road building, with prohibitions placed on grazing and mining, including mineral leasing. Unrestricted livestock access to the watershed which provides the Monument's water supply and which lies outside the Monument's present boundaries would be included in the prohibited activities, thereby enhancing the visitor's enjoyment of a natural appearing landscape as seen from the Monument and reducing the potential for upper watershed-related resource degradation.

Conclusions
Reduced timber harvesting and elimination of forest clearcutting and livestock access in the critical areas surrounding the Monument would help protect the Monument from increased surface run-off and sedimentation and prevent the drinking water from potentially becoming contaminated. It would also improve the visual quality for those visitors whose experience would be enhanced by the opportunity to see a natural appearing forested landscape on lands adjacent to the Monument.

Cumulative Impacts Under Alternative B

The cumulative effects of implementing Alternative B would be most significant and evident in regard to land use. Approximately 3,310 acres of adjacent SNF land would be recommended as a protected area, where certain land use practices would be prohibited within the surrounding watersheds. Certain types of forest timber harvesting and unrestricted livestock access to the watershed which provides the Monument's water supply, and which lies outside the Monument's present boundaries would be included in the prohibited activities. Over time, with restoration and replanting efforts by NPS, the environmental quality of the designated lands should improve.

Unavoidable Adverse Impacts Under Alternative B

The discontinuation of full-service meals, lodging, and expansive gift sales would be an adverse impact to some visitors. The absence of cave tours between early December and mid-March also would be an adverse impact for some visitors. Though substantially reduced, continued timber harvesting in the upper Cave Creek watershed could substantially impact the water quality in the watersheds containing karst geology and impact the cave resources.

Short-Term Use vs. Long-Term Productivity Under Alternative B

Changing land management practices would be the principal effect of designating a protected area that includes adjacent land within the SNF. The result would be to replace a public land management policy of multiple use with one emphasizing natural area preservation and recreational use. Land uses such as certain timber activities, livestock grazing, and mining would be prohibited in the protected area; the environmental damage associated with those uses would diminish in the absence of those activities and through the application of resource rehabilitation measures. The income derived from those uses would be foregone, but income could be generated from public visitation to the protected area and from tourism in the region.

A greater net return of monies to the government/taxpayer could result.

At present, the Federal Government receives 2% of the gross revenue from cave tours in the form of franchise fee payments. None of these fees directly support the interpretation, management and protection of the cave or maintenance activities associated with construction, improvement or upkeep of cave facilities. Under this alternative, all cave tour fees, estimated at $250,000 to $300,000 per year, would be used directly to support these functions. Cave tour revenues would completely fund the interpretive staff needed to conduct the operation.

Irreversible or Irretrievable Resource Commitments Under Alternative B

None beyond those identified above as common to all alternatives.

Alternative C—the Preferred Alternative: Enhanced Protection of Monument Resources and Visitor Experiences

Alternative C is the proposed action and "Preferred Alternative;" it emphasizes enhanced protection of the Monument resources and visitor experiences.

Effects on Natural Resources Under Alternative C

A boundary transfer of 3,310 acres of federal land within the SNF adjacent to the Monument to NPS would be undertaken to protect the upper watershed area above and adjacent to Oregon Caves. Cattle grazing, which may cause erosion of stream banks and sedimentation, would be eliminated within the expanded boundary with the result that water quality and riparian vegetation would improve, as well as protect amphibians that depend upon the Bigelow Lakes for breeding.

With elimination of logging within the watershed in the expanded boundary, there would be a reduction of sediment in adjacent streams, less soil erosion and runoff, and less impacts to water quality for potable use and habitat.

Edge effects from logging would be reduced around the Monument including potential windthrow, increased shrub density and changes in relative humidity and temperature. Nearly all studies on just a few groups of organisms indicate substantial impact of adjacent clearcuts and partial cuts on populations in adjacent old growth stands. These include Port Orford cedars and calypso orchids and certain trilliums, shrubs, spiders, butterflies, birds, epiphytic lichens, red tree voles, and beetles. Based on documented changes in sunlight, Rh, and other factors, there are likely to be other groups affected, but studies of such populations have not been published or located. Several studies indicate that some changes extend at least 500 feet from adjacent clearcuts. The land and populations of the present Monument affected is likely to be a significant percentage, given that the present Monument is only 484 acres. Expanding the size of the Monument under this alternative would likely decrease the amount of land and population affected to an insignificant or smaller percent affected by edge effects. Temporary or permanent extirpation (loss) of species, including species migrating into the caves, would be less likely under this alternative.

Potential infection of Port Orford cedars by Port Orford cedar root rot would be reduced by eliminating logging in the expanded boundary. Declines of fringed, long-eared, and long-legged myotis bat and the pallid bat, which may be from loss of old-growth forest and riparian areas outside the Monument, could benefit from reduction of timber harvesting in the area.

With the elimination of logging, there would be no timber slash within the watershed to impact roads and streams during periods of high rain and snowfall, lessening the chance of potential bridge washouts, landslides and debris flows. Reforestation would not be necessary within the Monument (except for existing clearcut areas), since logging would be eliminated. Previously cut-over areas gradually would assume natural forest conditions with the attendant benefits of greater ecological diversity. Cave ecosystems could be enhanced and better protected as a result.

The expanded boundary includes a small addition of serpentine soils on the southwest of the present Monument's boundary. This would give protection to the unique plants that are confined to this soil type.

Alternative C would provide greater protection than Alternative B to a large portion of Applegate marble that lies north of the Monument boundary and is continuous with the marble within the Monument. The potential for undiscovered caves is high. Protection of the marble by eliminating regional land uses such as logging, grazing and mining can reduce alteration of the natural system. For example, if the amount of precipitation such as runoff is increased, water may flow through the cave at a faster rate and be more chemically aggressive (undersaturated), thus dissolving speleothems.

In addition, Alternative C would provide more protection to the surrounding watersheds containing karst geology. Many karst areas throughout the world, including NPS karst lands, are affected by development and associated pollutants. The vast majority of the Monument is in old-growth forest. Addition of lands into the expanded boundary would protect the majority of this karst system by protecting the surface forest ecosystem.

The Monument's forest ecosystem is regionally and nationally significant and lies within a forest region perhaps more diverse and complex than any other in the West. In addition, the Monument's forest types are not well represented elsewhere in preserve status. Alternative C would provide greater protection over Alternative B and Alternative D regarding this resource by protecting a more significant number in preserve status.

Use of an employee shuttle van system would help control vehicular congestion to and from the Monument and within its developed areas; improved air quality due to fewer auto exhaust emissions would likely be one result. Air quality would probably improve also due to the cessation of dust and smoke-producing activities associated with timber harvest that occurred prior to including those lands within the expanded Monument.

The caves would be open for public touring from mid-March to early December of each year. The three and one-half month period when the caves are closed to the public would provide for periods of extended darkness to help restore natural conditions in the cave and provide an opportunity for necessary cave trail maintenance. Townsend's big-eared bats would benefit form cave closure during the winter by elimination of large tours. These tours seem to have an impact on bat use of certain portions of the cave. Significant increase in bat roosting was observed during the closure of 1996-1997 winter season. Within the last decade the overall bat population in the cave has undergone a substantial reduction even though the bat use inside the first two main cave entrances has increased during winter. Since large tours and perhaps lights appear to cause bats to move from their preferred roosting sites at Oregon Caves, closure of the tour route to such effects is likely to offset the overall bat decline. Evaluating whether human effects on invertebrates in the cave are significant is best done by studying populations in both space and time. This can only be done by closing a part of the tour route for substantial periods of time, even if such a closure does not restore populations to a pre-historic distribution.

Greater NPS control over the size, duration, timing and guiding of cave tours would likely result in the reduction of human-caused organics, desiccation and temperature changes from lights, and vandalism. The reduced organics and lights likely would allow some recovery of the invertebrates near the trail.

The transfer of additional acreage would also impact the fire prevention program, requiring additional patrol work during periods of high fire danger and increase potential for human caused fires. The management-ignited prescribed fire program would also be impacted, adding many acres of potential prescribed burns. There would be a need to inventory fuels on these additional acres as well as continue the present hazard reduction program.

Conclusions
The Monument's water quality and ecological diversity would be improved and protection of the cave ecosystems and aquatic communities would be enhanced. Elimination of logging and grazing in the upper watershed areas surrounding the Monument would protect the Monument from increased surface run-off and sedimentation and reduce the chance of the public drinking water from becoming contaminated. Declines of fringed, long-eared, and long-legged myotis bat and the pallid bat may improve. Greater protection would be provided to the watersheds containing karst geology than in Alternative B or Alternative D by including more of it in the expanded boundary. Alternative C would offer more protection than Alternative B to the extended Applegate Marble located outside the Monument boundary by including all of it in the expanded boundary and providing protection from development and other incompatible land uses. Air quality likely would be improved through use of a shuttle van system and the elimination of timber harvest on lands added to the Monument. Closure of the caves from public tours for three and one-half months would provide a period of rest for cave resources and would benefit the resident and migratory bat population of the area, especially the Townsend's big-eared bat.

Effects on Cultural Resources Under Alternative C

A new permanent building would be constructed at the administrative site for use as collections storage and would replace the existing inadequate quonset hut which would be removed. NPS would acquire the existing possessory interest in all the Monument buildings. The lower level of the Chalet would be used as a staffed on-site visitor center, with static exhibits, interactive displays, audio-visual programming, an information desk, and a cooperating association sales area. While such modification would be kept to only those minimum changes necessary, there would be some impact to the historic interior of the building. Concessioner gift sales would be moved to the Chateau. The upper level of the Chalet would be modified into apartments for NPS employees. Lodging and food service would continue to be provided by the concessioner in the Chateau. The Guide Dormitory would remain available to the concessioner for employee housing. The Checking and Comfort Station adjacent to the main parking lot would be preserved.

Conclusions
Adaptive reuse of the historic buildings would retain the historic character and preserve the integrity of the buildings. Adapting the lower level of the Chalet for an on-site visitor center would provide visitors the opportunity for enhanced interpretive and educational experiences. Minor impact to the historic interior of the building would be expected. Construction of a new facility for the Monument's collections storage would provide for long-term preservation of those resources, and their use in interpretive, resource management and research programs. The historic use of the Chateau would be retained, providing visitors a unique overnight lodging experience in an NHL building.

Effects on Scenic Resources Under Alternative C

In the near-term, visual quality would continue to be degraded with clearcuts still visible within the expanded Monument boundary, but eventually the forest would be re-established and the quality of experience for visitors would increase considerably for those who prefer to see forests managed to emphasize natural area preservation instead of timber production.

Though visitors would continue to observe previous clearcut areas in foreground and middleground views from viewpoints within the Monument and on adjacent trails in the near term, future protection would be provided with an expanded boundary. A boundary transfer of 3,310 acres of federal land within the SNF to the Monument would protect the scenic views over time as seen from the Monument and along adjacent trails.

Conclusions

The potential for an enhanced visitor experience would increase due to improved scenic quality over the long-term.

Effects on Visitor Use/Interpretation Under Alternative C

An on-site visitor center located in the lower level of the Chalet, including self-guided exhibits and multi-media presentations, would provide visitors with substantially increased opportunities for obtaining basic information about the Monument and interpretation of Monument resources and programs. It would also allow for new opportunities to interpret old growth forests and historic resources.

The IVVC in Cave Junction would provide information and orientation services regarding the Monument to assist visitors in making decisions before they drive the long distance. The facility would also be important in providing information about tourist and recreation opportunities in southwest Oregon (and portions of northern California that sit within the geologic providence associated with the Monument and the Highway 199 corridor upon which the tourist traffic visiting Oregon Caves commonly travels). This integration of information services under one roof would be a key factor in developing partnerships with local federal, state, county and city agencies whose primary interests are development and promotion of tourist and recreation opportunities. The building would be enlarged to include a meeting room and space for a small Chamber of Commerce office.

Cave tours would be scheduled, with tickets for a particular tour time, and sold in advance at the IVVC or at the visitor center in the Chalet building, enabling visitors to purchase their cave tour tickets and plan their day's activities around the scheduled time. Tours would be operated by the NPS with direct supervisory control over cave guides and all revenues produced by cave tours would directly support cave interpretation. The tours would be conducted by NPS rangers and would have a smaller guide to visitor ratio. This would enable visitors to enjoy a ranger-led tour of the cave resource in a smaller group. Reduced group size would allow for better interaction with the guide.

With a defined carrying capacity below current use levels, some visitors during peak demand periods would be unable to take a tour at a specific time or date. This would result in some dissatisfaction with visitors who are unwilling or unable to remain to take a later tour or a tour offered on the following day.

There would be limited parking at the Monument under Alternative C and shuttle service from Cave Junction would not be provided, except for employees. This could result in congestion and problems for visitors trying to park their cars on heavy visitation days. It is expected that the installation of scheduled tours, with a reservation system and advance ticket sales at the IVVC in Cave Junction, would decrease the total number of cars that travel up to the Monument and stay parked there for several hours. Fewer vehicles within the Monument and their general restriction from the National Register historic district would create a safer environment by reducing the potential for pedestrian-vehicular conflicts. Parking spaces for persons with disabilities, staff, and official government cars would be provided. Parking lot usage would be monitored, and if space capacities are reached on a continuing basis, alternative strategies to accommodate visitors would be pursued.

Fees obtained for cave tours would be returned to the park for the direct benefit of the public use of the caves.

It is expected that objection to the user fees would be minimal since they would basically replicate the current fee structure.

Alternative C calls for the caves to be closed to the public from early December to mid-March each year. This could cause a problem for some visitors who would want to tour the caves during those months. Monument records indicate that visitation during that period has historically been very low because of poor weather and road conditions, so relatively few visitors would likely be affected.

A concessioner would continue to provide the visitor with lodging and food service in the Chateau. Concession gift sales would be moved to the Chateau. It would be mandatory for the concessioner to provide these services during the peak season, but would be discretionary whether to provide some or all of them during the non-peak times. No concession services would be provided during the off-season period between early December and mid-March.

Expansion of the boundary of the Monument to include the upper portions of the Cave Creek and Lake Creek watersheds above and adjacent to the caves would prohibit timber harvesting and grazing in the watershed which provides the Monument's water supply. This would improve the potential for safe drinking water for the public and Monument employees. Inclusion into the Monument of the additional lands proposed in Alternative C also would provide recreation opportunities such as expanded hiking trails, nature walks, and cross-country skiing and snowshoeing. Active interpretation of the Bigelow Lakes and Lake Creek areas would be initiated.

Snowmobile use may be permitted within the Monument but limited to certain unplowed road corridors that link adjacent forest lands. While snowmobile emissions are a concern to overall air quality, their use would be minimal and therefore the effect of their continued use would not result in a significant impact to Monument air quality.

There would be no fee collection for use of trails within the expanded Monument.

All above-ground utility lines would be buried which would enhance maintenance, visitor safety and aesthetics. The routine maintenance of cutting and clearing vegetation around power lines would not be necessary. The visual intrusion of power lines in an historic setting would be removed.

Conclusions

The ability to schedule cave tours and purchase tickets in advance at the IVVC would enhance the visitor experience by providing more flexibility in scheduling personal activities and would remove the necessity of driving up to the Monument and waiting long periods of time to take the tour. Cave tours operated by the NPS would allow Monument staff more direct ability to provide the visitor with a quality interpretive experience. However, some visitors may not be able to take tours on certain peak visitation days due to carrying capacity limits.

The addition of an on-site visitor center at the Monument would provide information and educational opportunities not currently available. Lodging, food service and gift and sundries sales are services provided by the concessioner that would enhance the visitor's experience.

There would be limited parking at the Monument under Alternative C and shuttle service from Cave Junction would not be provided, except for employees. This could result in congestion and problems for visitors trying to park their cars on heavy visitation days. It is expected that the installation of scheduled tours, with a reservation system and advance ticket sales at the IVVC in Cave Junction, would decrease the total number of cars that travel up to the Monument and stay parked there for several hours. Parking spaces for persons with disabilities, staff, and official government cars would be provided. Parking lot usage would be monitored, and if space capacities are reached on a continuing basis, alternative strategies to accommodate visitors would be pursued.

The three and one-half month closure of the caves for public touring would occur at a time when visitation is traditionally low because of poor weather and road conditions. Those visitors who do visit the Monument would have their experience diminished by the closure of the caves and the lack of concession services during this time period.

Effects on Park Facilities/Staffing/Operations Under Alternative C

Including the administrative site within a contiguous boundary would simplify park operations. The need for special interagency agreements would be eliminated. Compliance reviews for management actions could be completed by Monument staff. Incompatible uses, such as hunting and mushroom picking in residential and maintenance areas would be eliminated. Transportation between the primary pubic use area and maintenance facility would occur entirely within boundaries allowing NPS greater latitude in performing snow plowing or entering into cooperative agreement for road maintenance.

Office space for staff would be improved with the construction of new administrative offices at the administrative site. Inadequate collections storage capability would be relieved by transferring them into the new facility at the administrative site.

Interest in an on-site visitor center was expressed during the public scoping period. An on-site visitor center would enhance NPS staff's ability to interact with the public, and would offer visitors a chance to become better oriented before touring the cave and exploring the Monument. The lower level of the Chalet would be used as a staffed on-site visitor center and would enhance NPS contact with visitors. Adaptively reusing the Chalet as a visitor center provides essential visitor services without the requirement of construction of a new building.

Conclusions

Adaptively reusing the Chalet as an on-site visitor center would enhance NPS staff's ability to interact with the public, and would offer visitors a chance to become oriented before touring the cave. Adequate staffing would allow NPS to assume a key role in interpretive programs; compliance with NPS management guidelines and policies would result. Development of suitable office space, collections storage, and staff housing would greatly benefit the Monument's natural and cultural resources, and the visiting public through improved efficiencies and effectiveness in the operation of the Monument.

Adequate administrative facilities would be provided in this alternative outside of the Monument core use area. Providing a new collection storage area at the administrative site would improve the staff's ability to effectively protect Monument resources. Additional staff would be required for visitor center staff, cave tours and additional maintenance needs.

Effects on Socioeconomic Factors Under Alternative C

Implementation of Alternative C would result in the highest positive economic benefit to the economy of the communities of the Illinois Valley and the State of Oregon of any of the four alternatives presented. Estimated economic benefits to the area are higher than those anticipated under either Alternatives A, B, or D. This is attributable to the effect of the increased investment of government salaries into the economy of the area, sustained lodging and food service revenues and resultant expenditures by the concessioner, and the purchase of goods and services by the cooperating association in conjunction with visitor center operations. Potential increased visits or length of visits would have indirect financial benefits to Josephine County and the Illinois Valley communities.

Under Alternative C, an estimated total of 230 jobs are created under this alternative. This includes 123 jobs directly or indirectly created by tourism expenditures, 65 jobs by expenditures of the NPS, and 42 by non-governmental expenditures by the concessioner and the cooperating association. Under this alternative the estimated combined annual wholesale and retail sales benefit to area tourism amounts to some $7,656,000 in goods and services purchased, and a combined tax benefit to the State of Oregon and local communities of some $206,000.

Timber Sales

Josephine County receives payments from the state derived from federal payments for a percentage of timber revenues (50% on O & C lands and 25% on other lands) generated on the SNF within the county. By expanding the boundaries of Oregon Caves National Monument as proposed under Alternative C, a corresponding reduction in payment to the county would be anticipated. However, with the establishment of the LSR within SNF by the *Northwest Forest Plan* (LSRs are excluded from national forests general timber quota), timber harvest has been greatly reduced on these lands. An exception are the timber sales made prior to the establishment of the LSR. Cutting and resultant county revenues generated by these existing sales would not be changed or affected by Alternative C, since these constitute valid existing contracts, except in those limited instances where revenues would be received from infrequent thinning and salvage operations within this LSR.

Indirect payments authorized to the county as a result of Public Law 103-66, commonly referred to as the "owl guarantee," would be unaffected under Alternative C, since the monies are set by legislation.

Payments in Lieu of Taxes

Payments in lieu of taxes made to the county for qualified federal resource lands, otherwise known as "entitlement lands," would remain unchanged under Alternative C, since lands added to the Monument would also be eligible for these payments..

Tourism

Construction of enhanced visitor facilities would provide short-term jobs for the area. An increase in tourist revenues generated by an new on-site visitor center, enhanced visitor facilities, and increased recreational activities, may be realized by the local economy.

Low Income/Minority Populations

The concessioner currently employs people in a county with a median income level that is below the state average and with a small minority population.

Replacing concessioner cave tour guides with NPS staff would provide a positive improvement for low income population segments in Josephine County. The NPS invests a large part of its budget in its staff in the form of specialized training and higher wages. The NPS also offers better career opportunities and sustains a goal of increasing ethnic diversity in the workplace which means there would be more effort to employ minority segments of the community in Josephine County.

Conclusions
Low income/minority populations would not be expected to be negatively impacted.

Due to restrictions already in place for LSRs, Josephine County would not be negatively impacted by timber sales revenue, except for some potential loss of revenue from infrequent thinning and salvage operations. The county may benefit from revenues due to additional visitation.

Effects of Boundary Adjustment/Land Protection Under Alternative C

Changing land uses would be the principal effect of transferring 3,310 acres of land from the SNF to the Monument. The result would be to replace a public land management policy of multiple use with one emphasizing natural area preservation and recreational use. Land uses such as timber harvesting, livestock grazing, and mining would be prohibited on lands added to the Monument; the environmental damage associated with those uses would diminish in the absence of those activities and through resource rehabilitation. The income derived from those uses would be foregone, but income could be generated from public visitation to an enlarged Monument and from tourism in the region. With all affected acreage already in federal ownership, there would be no change in property tax revenues.

Conclusions
Land uses such as timber harvesting and livestock grazing would be eliminated on land added to the Monument; the land added to the Monument would be managed to preserve and enhance its value as a natural area and to offer public recreation opportunities. The environmental quality of the land should improve over time. While potential income that would have been generated by land uses on USFS land would be foregone, income would be generated by visitors to the Monument and to the region in which it is located. Because only federal lands would be affected, there would be no change in property tax revenues.

Cumulative Impacts Under Alternative C

The cumulative effects of implementing Alternative C would be most significant and evident in regard to land use and visitor experience.

Approximately 3,310 acres of land would be transferred from USFS management, as part of the adjacent SNF, to NPS management as an addition to the Monument. Past and present USFS management of those lands emphasized such multiple uses as timber harvest and grazing, while the NPS would emphasize the preservation and recreational use of those lands. The direct and indirect environmental effects associated with logging and grazing such as lowered water quality, soil erosion, fragmentation of habitat, and degraded scenic quality, would be addressed under a management policy that would emphasize resource rehabilitation and preservation. Over time, the environmental quality of the transferred lands should improve with restoration and replanting efforts. The larger Monument, managed to ensure the on-going enhancement and preservation of its natural values, would contribute to the restoration and maintenance of the old-growth forest ecosystem in the region.

Limited interpretive opportunities outside the cave tour has characterized the Monument in the past and present;

that fact has detracted and continues to detract from the visitor's experience. Under Alternative C, substantial new interpretive opportunities and enhanced visitor facilities would be provided, such as interpreting old growth forests and historic resources, thereby increasing considerably the potential for an enhanced visitor experience.

Unavoidable Adverse Impacts Under Alternative C

The absence of cave tours and concession services between early December and mid March would be an adverse impact for some visitors.

Short-Term Use vs. Long-Term Productivity Under Alternative C

Changing land uses would be the principal effect of adding land from SNF to the Monument. The result would be to replace a public land management policy of multiple use with one emphasizing natural area preservation and recreational use. Land uses such as timber harvesting, livestock grazing, and mining would be prohibited on lands added to the Monument; the environmental damage associated with those uses would diminish in the absence of those activities and through the application of resource rehabilitation measures. Increased income would be generated from public visitation to an enlarged Monument and from tourism within the region.

A greater net return of monies to the government/taxpayer could result. Cave tour revenues generated should exceed additional staffing and operational costs of providing the tours. Excess revenues would either be returned to general funds or used to support operations, dependent on existing legislation.

At present, the Federal Government receives less than 2% of the gross revenue from cave tours in the form of franchise fee payments. None of these fees directly support the interpretation, management and protection of the cave or maintenance activities associated with construction, improvement or upkeep of cave facilities. Under this alternative, all cave tour fees, estimated at $250,000 to $300,000 per year, would be used directly to support these functions. Cave tour revenues would completely fund the interpretive staff needed to conduct the operation.

The county and local economies would benefit over the short-term and the long-term under Alternative C. Construction of enhanced visitor facilities would provide short-term jobs for the area. Anticipated increases in visitation may be realized by the local economy.

Money collected from ranger guided tours would be used on cave restoration and maintenance and other related needs.

Irreversible or Irretrievable Resource Commitments Under Alternative C

None beyond those identified above as common to all alternatives.

Alternative D—Increased Visitor Services and Recreation Opportunities Combined With Watershed Protection

Alternative D emphasis watershed protection and increased visitor services and recreational opportunities.

Effects on Natural Resources Under Alternative D

Implementation of Alternative D would call for the NPS to enter into either a written agreement with a nonprofit institute, cooperating interpretive association or other entity to augment the NPS responsibility in the provision of guided cave tours. Since NPS does not exercise direct control over the tour size, duration and timing, the cave could continue to be exposed to unsupervised visitors, resulting in a high potential for damage to speleothems (e.g., touching and breaking formations, graffiti). Large tours, if allowed, could likely continue to disturb populations of Townsend's big-eared bats during winter between the main entrance and the 110 Exit. Within the last decade the overall bat population in the cave has undergone a substantial reduction even though the use inside the first two main cave entrances has increased during winter. Since large tours and perhaps lights appear to cause bats to move from their preferred roosting sites at Oregon Caves, bats would continue to be impacted.

A boundary transfer of 2,373 acres of SNF land to NPS, and a 937 acre protected area within SNF would be recommended. The enlarged Monument would include the upper watersheds of Lake and Cave Creek area above and adjacent to Oregon Caves. Within the expanded Monument, cattle grazing which may cause erosion of stream banks and sedimentation, would be eliminated with the result that water quality and riparian vegetation would improve. Cave ecosystems could be enhanced and better protected as a result. Declines of fringed, long-eared, and long-legged myotis bat and the pallid bat, which may be from loss of old-growth forest and riparian areas outside the Monument, could benefit from greater protection.

With elimination of timber harvesting in the upper Cave Creek and upper Lake Creek watersheds there would be a reduction of sediment in adjacent stream, less soil erosion and runoff, and less impacts to water quality for potable use and water potentially entering the cave.

Edge effects from logging would be reduced around the Monument including potential windthrow, increased shrub density and changes in relative humidity and temperature. Nearly all studies on just a few groups of organisms indicate substantial impact of adjacent clearcuts and partial cuts on populations in adjacent old-growth stands. These include Port Orford cedars and calypso orchids and certain trilliums, shrubs, spiders, butterflies, birds, epiphytic lichens, red tree voles, and beetles. Based on documented changes in sunlight, Rh, and other factors, there are likely to be other groups affected, but studies of such populations have not been published or located. Several studies indicate that some changes extend at least 500 feet from adjacent clearcuts. The land and populations of the present Monument affected is likely to be a significant percentage, given that the present Monument is only 484 acres. Expanding the size of the Monument under this alternative would likely decrease the amount of land and population affected to an insignificant or smaller percent affected by edge effects. Temporary or permanent extirpation (loss) of species, including species migrating into the caves, would be less likely under this alternative, but more than under Alternative C.

Potential infection spread to Port Orford cedars by Port Orford cedar root rot would be greatly reduced by eliminating logging in both upper Cave and upper Lake Creek watersheds and restricting it within the protected area in the lower Lake Creek watershed.

With the reduction of timber harvesting in the protected area and elimination of harvest in both upper Cave Creek and upper Lake Creek watersheds, there would be less timber slash to impact roads and streams during periods of high rain and snowfall, lessening the chance of potential bridge washouts, landslides and debris flows. Large scale reforestation, which is difficult in this area due to soils and elevation, would not be necessary within the protected area (except for existing clearcut areas), since timber harvesting would be severely limited. However, some small scale reforestation may be necessary. Previously cut-over areas gradually would assume natural forest conditions with the attendant benefits of greater ecological diversity. Cave ecosystems could be enhanced and better protected as a result.

The expanded boundary includes a small addition of serpentine soils on the southwest of the present Monument's boundary. This would give protection to the unique plants that are confined to this soil type.

Alternative D provides greater protection to the adjacent watersheds containing karst geology than Alternative B by including much of it in the Monument's boundary. Many karst areas throughout the world, including NPS karst lands, are affected by development and associated pollutants. The vast majority of the Monument is in old-growth forest. Addition of lands into the expanded boundary would protect a large portion of this karst system by protecting the surface forest ecosystem by reducing future incompatible land uses.

The Monument's forest ecosystem is regionally and nationally significant and lies within a forest region perhaps more diverse and complex than any other in the West. In addition, the Monument's forest types are not well represented elsewhere in preserve status. Alternative D would provide more protection for this resource over Alternative B by protecting more in preserve status.

In addition, this alternative would provide the same amount of protection as Alternative C to a large portion of Applegate marble that lies north of the Monument boundary and is continuous with the marble within the Monument. The potential for undiscovered caves here is high. Protection of the marble from regional land uses such as logging, grazing and mining could reduce alteration of the natural system. For example, if the amount of precipitation (runoff) is increased, water may flow through the cave at a faster rate and be more chemically aggressive (undersaturated), thus dissolving speleothems.

Use of an employee shuttle van system during the peak season would help control vehicular congestion to and from the Monument and within its developed areas; improved air quality due to fewer auto exhaust emissions would likely be one result. Air quality would probably improve also due to the cessation of dust and smoke-producing activities associated with timber harvest that occurred prior to including those lands within the expanded Monument. There would be temporary, short-term, localized decreases in air quality during development projects such as construction of the new on-site visitor center. The visitor center would be constructed in the main parking lot adjacent to the Checking and Comfort Station.

However, historic records show that the main parking lot, former Monument headquarters building, and upper parking lot probably were built on a pre-existing slide, and have been impacted with land sliding that occurred in 1942 and 1954. The record rainfall occurring during the winter of 1996-1997 caused a solution cavity collapse under the main parking lot and resulted in abandonment of the Monument headquarters building. Limestone formations underneath these facilities allow water to penetrate, causing saturation and ultimate land movement. Given the limited amount of choices available to site a new visitor center, the location for construction at the east end of the main parking lot would place the building adjacent to potentially unstable land. Though engineering design can mitigate soil instability for the building, the immediate area may continue to be impacted by future wet winters, resulting in landsliding, slumping or settlement.

Development of additional visitor parking at the shuttle van staging area, could affect previously undisturbed land. Approximately two acres of land would be needed to build additional parking at either the administrative site or at the helispot location. Effects of this in the immediate project area would be vegetation removal, loss of wildlife habitat, and the potential for water quality degradation.

Conclusions
The Monument's water quality and ecological diversity would be improved and protection of the cave ecosystem and associated aquatic communities would be enhanced. Declines of fringed, long-eared and long-legged myotis bat and the pallid bat could improve. Alternative D would provide more protection to the watersheds containing karst geology over Alternative B since much of it would be contained within the expanded Monument. Alternative D would provide the same amount of protection as Alternative C to the extended Applegate Marble outside the Monument boundary by eliminating certain incompatible land use activities. Air quality likely would be improved through use of an employee shuttle van system and the elimination of timber harvest on lands added to the Monument, but major development projects would contribute to short-term, localized declines in air quality during construction. Construction of a parking lot associated with the employee shuttle van system could occur in a previously undeveloped area with the attendant loss of natural attributes such as vegetation and wildlife habitat. Construction of a new on-site visitor center would occur on unstable land. In addition there would be some vegetation removal, loss of wildlife habitat, and the potential for short-term water quality degradation due to run-off from the parking lot.

Effects on Cultural Resources Under Alternative D

With the construction of a suitable storage facility, the preservation of Monument collections would be assured and their accessibility for research and interpretive purposes would be improved.

Conclusions
Collections resources would be preserved and their potential for research and interpretive use would increase. Other historic buildings in the National Register historic district would continue to be used and maintained in an appropriate manner.

Effects on Scenic Resources Under Alternative D

Though visitors would continue to observe clearcut areas in foreground and middleground views from viewpoints within the Monument and on adjacent trails, in the near-term, future protection would be provided with an expanded boundary. The transfer of 2,373 acres of federal land from SNF to the Monument and a 937 acre protected area within the adjacent SNF land would protect the scenic views over time as seen from the Monument and along adjacent trails. The protected area would be managed under USFS guidelines for Full Retention Visual with restrictions placed on certain logging activities and additional road building, and prohibitions placed on grazing and mining. The foreground and portions of middleground views would be protected by preserving the natural setting.

Conclusions

The potential for an enhanced visitor experience would increase due to improved scenic quality over the long-term.

Effects on Visitor Use/Interpretation Under Alternative D

Visitors would encounter substantially increased interpretive opportunities through the developed and staffed new on-site visitor center and the expanded IVVC. With a cave tour reservation system in place, delays in accessing the cave should be minimized, thereby further enhancing the quality of the visitor experience. That experience likely would be satisfactory for those who expect to find in-park lodging, gift shops, and full food services during their visit, but could be less so for those visitors who believe the array of such services is better located outside the Monument. Similarly, for those who expect to see NPS rangers conducting cave tours, the experience could be diminished somewhat since that function would be carried out mainly by institute staff.

With a defined carrying capacity below current use levels, some visitors during peak demand periods would be unable to take a tour at a specific time or date. This would result in some dissatisfaction with visitors who are unwilling or unable to remain to take a later tour or a tour offered on the following day.

Use of an employee shuttle van system during the peak season would help control vehicular congestion to and from the Monument, and within its developed areas. That would be viewed by many as a positive condition, but as a negative one by those who want to drive everywhere. Fewer vehicles within the Monument and their general restriction from the National Register historic district would create a safer environment by reducing the potential for pedestrian-vehicular conflicts.

The USFS would be able to continue to collect fees for trail use within the protected area. There would be no fee collection for use of trails within the expanded Monument.

Snowmobile use may be permitted within the Monument but limited to certain unplowed road corridors that link adjacent forest lands. While snowmobile emissions are a concern to overall air quality, their use would be minimal and therefore the effect of their continued use would not result in a significant impact to Monument air quality.

All above-ground utility lines would be buried which would enhance maintenance, visitor safety and aesthetics. The routine maintenance of cutting and clearing vegetation around power lines would not be necessary. The visual intrusion of power lines in an historic setting would be removed.

Conclusions

The potential for an enhanced visitor experience would increase due to improved scenic quality (over the long-term), greatly enhanced interpretive opportunities, including construction of a new on-site visitor center, maintenance of food and lodging opportunities, and the introduction of operational systems to reduce congestion at the developed areas of the Monument.

Effects on Park Facilities/Staffing/Operations Under Alternative D

Including the administrative site within a contiguous boundary would simplify park operations. The need for special interagency agreements would be eliminated. Compliance reviews for management actions would be completed by Monument staff. Incompatible uses, such as hunting and mushroom picking in residential and maintenance areas, would be eliminated. Transportation between the primary pubic use area and maintenance facility would occur entirely within boundaries, allowing NPS greater latitude in performing snow plowing or entering into cooperative agreement for road maintenance.

Office space for staff would be improved with the construction of new administrative offices and housing at the administrative site. Inadequate collections storage capability would be relieved by transferring them into the new facility at the administrative site.

Interest in an on-site visitor center was expressed during the public scoping period. An on-site visitor center would enhance NPS staff's ability to interact with the public, and would offer visitors a chance to become oriented before entering the historic district and before touring the cave. The new building would be constructed outside of the historic district but would be compatible in design, and offer additional space for needed interpretation, sales, and offices.

While the site is adequate for retaining a vehicle parking function, the historical instability of this area makes public facility construction more costly and problematic, with some risk of potential loss of public investment in the site.

NPS staffing would be at sufficient levels to enable all interpretive programs to be offered by NPS or closely monitor the quality of programs carried out by non-NPS staff; the result would be compliance with NPS-6, NPS-48 and other NPS management policies regarding basic and essential interpretative operations.

Conclusions

Adequate staffing would allow NPS to assume a key role in interpretive programs; compliance with NPS management guidelines and policies would result. Development of suitable office space, collections storage, maintenance facility, and housing, coupled with adequate numbers of staff would greatly benefit the Monument's natural and cultural resources, and the visiting public through improved efficiencies and effectiveness in the operation of the Monument. Construction of a new on-site visitor center would enhance NPS staff's ability to interact with the public, and would offer visitors a chance to become oriented before entering the historic district and before touring the cave. However, new construction for a visitor center presents potential risks to public investment by siting a new facility on potentially unstable land.

Effects on Socioeconomic Factors Under Alternative D

Alternative D would result in a positive economic impact to the economy of the Illinois Valley and to the State of Oregon. Alternative D would have the second highest economic benefit among the four alternatives presented. Only Alternative C is higher. The combined benefit of jobs created is 222, second only to Alternative C in total job creation. This includes 123 jobs directly or indirectly created by tourism expenditures, 42 jobs by expenditures of the NPS, and 57 jobs created by non-governmental expenditures by the concessioner, cooperating association and non-profit institute. Economic impacts are similar to Alternative C in that concession contractors and a cooperating association would be purchasing goods and services. However, unlike the preferred alternative, a non-profit institute provides employment to the cave guides vs. the NPS, hence some greater economic benefit can be attributed to non-governmental expenditures and fewer benefit attributed to expenditures by the NPS than in Alternatives B and C.

If Alternative D were implemented, this would result in a combined annual wholesale and retail sales benefit to area tourism of some $7,460,000 in goods and services purchased, and a combined tax benefit to the State of Oregon and local communities in the Illinois Valley of $200,000 per year.

Timber Sales

Josephine County receives payments from the state derived from federal payments for a percentage of timber revenues (50% on O & C lands and 25% on other lands) generated on the SNF within the county. By expanding the boundaries of the Monument by 2,373 acres as proposed under Alternative D, a corresponding reduction in payment to the county would be anticipated. However, with the establishment of the LSR within SNF by the *Northwest Forest Plan* (LSRs are excluded from national forests general timber quota), timber harvest has been greatly reduced for these lands. An exception are the timber sales made prior to the establishment of the LSR. Cutting and resultant county revenues generated by these existing sales would not be changed or affected by Alternative D, since these constitute valid existing contracts, except in those limited instances where revenues would be received from infrequent thinning and salvage operations within this LSR.

Indirect payments authorized to the county as a result of Public Law 103-66, commonly referred to as the "owl guarantee," would be unaffected under Alternative D, since the monies are set by legislation.

Payments in Lieu of Taxes

Payments in lieu of taxes made to the county for qualified federal resource lands, otherwise known as "entitlement lands," would remain unchanged under Alternative D, since lands added to the Monument would also be eligible for these payments.

Tourism

Construction of enhanced visitor facilities, including a new on-site visitor center, would provide short-term jobs for the area. An increase in tourist revenues generated by an new on-site visitor center, enhanced visitor facilities, and increased recreational activities may be realized by the local economy.

Low Income/Minority Populations

The concessioner currently employs people in a county with a median income level that is below the state average and with a small minority population.

Low income/minority populations in the local communities could benefit from possible employment at the Monument as NPS or concession staff or as workers on construction projects, such as the on-site visitor center.

Conclusions

Employment of low income/minority populations from local communities could occur.

Due to restrictions already in place for LSRs, Josephine County would not be negatively impacted by timber sales revenue, except for some potential loss of revenue from infrequent thinning and salvage operations. The county would probably benefit from revenues due to additional visitation.

Effects of Boundary Adjustment/Land Protection Under Alternative D

Changing land management would be the principal effect of transferring 2,373 acres of land from the SNF to the Monument. The result would be to replace a public land management policy of multiple use with one emphasizing natural area preservation and recreational use. Land uses such as timber harvesting, livestock grazing, and mining would be prohibited on lands added to the Monument boundary; the environmental damage associated with those uses would diminish in the absence of those activities and through resource rehabilitation.

Designation of a 937 acre protected area within the adjacent SNF would be managed under USFS guidelines for Full Retention Visual. These guidelines requires that management activities be conducted in such a way that they are completely subordinate to the natural character of the landscape. Limited timber harvest activities could include single tree selection and some selective harvest. Restrictions would be placed on certain incompatible logging activities and additional road building, with prohibitions placed on grazing and mining. The income derived from those uses would be foregone, but income could be generated from public visitation to an enlarged Monument and from tourism in the region. With all affected acreage already in federal ownership, there would be no private property tax loss.

Conclusions
Land uses such as timber production and livestock grazing would be eliminated on land added to the Monument and would be managed to preserve and enhance its value as a natural area and to offer public recreation opportunities. The inclusion of a protected area would provide additional viewshed protection to portions of middleground views and restrictions placed on certain logging activities and additional road building, and prohibitions placed on grazing and mining. The environmental quality of the land should improve over time. While income that would have been generated by land uses on USFS land would be foregone, income would be generated by visitors to the Monument and to the region in which it is located. Because only federal lands would be affected, there would be no change in property tax revenues.

Cumulative Impacts Under Alternative D

The cumulative effects of implementing Alternative D would be most significant and evident in regard to land use and visitor experience.

Approximately 2,373 acres of land would be transferred from the USFS management, as part of the SNF, to the NPS management as an addition to the Monument. Congressional legislation would be required to add the 2,373 acres of adjacent SNF to the existing boundary. Past and present USFS management of those lands emphasized such multiple uses as timber production and grazing while the NPS would emphasize the preservation and recreational use of those lands. The direct and indirect environmental effects associated with logging and grazing such as lowered water quality, soil erosion, fragmentation of habitat, and degraded scenic quality, would be addressed under a management policy that would emphasize resource rehabilitation and preservation. Over time, the environmental quality of the transferred lands should improve through restoration efforts. The larger Monument, managed to ensure the on-going enhancement and preservation of its natural values, would contribute to the restoration and maintenance of the old-growth forest ecosystem in the region.

In addition, a 937 acre protected area would be designated within the adjacent SNF and would be managed by USFS in cooperation with the NPS. This protected area would be managed with restrictions placed on certain logging activities and additional road building, and prohibitions placed on grazing and mining. The area is critical for the protection of middleground views as seen from the viewpoints within the Monument and would be managed under USFS guidelines for Full Retention Visual.

A limited number of interpretive opportunities has characterized the Monument in the past and present; that fact has detracted and continues to detract from the visitor's experience. Under Alternative D, substantial new interpretive opportunities would be provided, thereby increasing considerably the potential for an enhanced visitor experience.

Unavoidable Adverse Impacts Under Alternative D

None identified.

Short-Term Use vs. Long-Term Productivity Under Alternative D

Changing land uses would be the principal effect of adding land from the SNF to the Monument. The result would be to replace a public land management policy of multiple use with one emphasizing natural area preservation and recreational use. Land uses such as timber harvesting, livestock grazing, and mining would be prohibited on lands added to the Monument; the environmental damage associated with those uses would diminish in the absence of those activities and through the application of resource rehabilitation measures. Increased income would be generated from public visitation to an enlarged Monument and from tourism in the region.

The county and local economies would benefit over the short-term and the long-term under Alternative D. Construction of enhanced visitor facilities, including a new on-site visitor center, would provide short-term jobs for the area. Anticipated increases in visitation may be realized by the local economy.

A greater net return of monies to the government/taxpayer could result. Cave tour revenues generated should exceed additional staffing and operational costs of providing the tours. Excess revenues would either be returned to general funds or used to support operations, dependent on existing legislation.

Irreversible or Irretrievable Resource Commitments Under Alternative D

None beyond those identified above as common to all alternatives.

Siskiyou Fritillaria
(*Fritillaria glauca*)

Summary of Public Involvement

Summary of Public Involvement

A Notice of Intent to prepare an environmental impact statement for Oregon Caves National Monument was published in the *Federal Register* on January 23, 1996 (Volume 61, Number 15, pages 1783-1784). In early March, a newsletter was produced by the National Park Service and distributed both to individuals on the Monument's mailing list and to readers of the *Illinois Valley Newspaper.* (Newsletters were inserted into the newspaper which has a circulation of about 3400 people.) The purpose of the newsletter was to provide the following information: explain the general management planning process to the public, relate relevant information about the Monument, provide dates, time and location for the public scoping meetings, and encourage public participation and comment on issues or problems that needed to be addressed at the Monument.

In accordance with NPS responsibilities with the National Historic Preservation Act, the Oregon State Historic Preservation Officer and Advisory Council on Historic Preservation were notified in June 1996. The director of Oregon Parks and Recreation Department were also notified during this period.

To fulfill the compliance requirements for the Endangered Species Act (Section 7 Consultation), the U.S. Fish and Wildlife Service were notified in March 1996. A list of threatened and endangered species that occur within the area of the Monument were sent to NPS.

Scoping Meetings

Two public scoping meetings were held in March 1996. The purpose of these meetings was to identify additional issues that should be addressed in the GMP/EIS. The first meeting was held from 7:00-9:00 p.m. on March 19 at the Illinois Valley Senior Center in Cave Junction, Oregon. Fourteen people attended as interested private citizens or as representatives of the following organizations: Siskiyou Education Research Project, Friends of Caves, Illinois Valley Senior Center, Estey Corporation, Oregon Caves Company and the National Park Service.

A second meeting was held from 7:00-9:00 p.m. on March 21 at the Grants Pass City Council Chambers in Grants Pass, Oregon. In attendance were nine people representing Oregon Caves Company, Estey Corporation, and the NPS.

Individual meetings were held by the NPS planning team with several interest groups at their request. On the morning of March 19, in Cave Junction, Oregon, the GMP/EIS planning team met with the concessioner, represented by Estey Corporation and Oregon Caves Company. Later that afternoon, the NPS met with the Illinois Valley District Ranger Office, Siskiyou National Forest, USFS. In attendance were the district ranger, a wildlife fisheries biologist, district fire officer and an assistant recreation staff member.

On March 21, the NPS met with conservation group representatives of the Siskiyou Educational Research Project, Rogue Valley Audubon, and Siskiyou Audubon. In the afternoon, NPS planning team met with the USFS, Siskiyou National Forest Supervisor's Office in Grants Pass. In attendance were the forest supervisor, the chief of planning, and a natural resource staff member.

During the public scoping period a total of 88 letters were received from 12 states, with 56 letters coming from Oregon. The primary issues expressed were a need for the following: a boundary expansion to protect the cave and surrounding natural resources; protection of the viewshed from clearcutting, and other USFS management activities into surrounding lands as seen from the Monument; shuttling of visitors from the Illinois Valley Visitor Center to the Monument; expanding recreational opportunities within the Monument and adjacent areas; and providing an on-site visitor center to interpret the natural history of the region.

Douglas' Squirrel
(*Tamiasciurus douglasii*)

List of Preparers and Cooperating Entities

List of Preparers and Cooperating Entities

Planning Team Composition and Functions

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Superintendent, Oregon Caves National Monument, NPS, Cave Junction, Oregon, Direct Park Management and Policy Issues

Mr. Keith Dunbar
Project Manager, Planning and Partnerships, Columbia Cascades Support Office (CCSO), NPS, Seattle, Washington, Planning Team Leader/Overall Project Coordination

Mr. Al Hendricks
Superintendent, Crater Lake National Park, Crater Lake, Oregon, NPS, Direct Park Management and Policy Issues

Ms. Sheri Forbes
Former Chief of Interpretation, Oregon Caves National Monument, NPS, Cave Junction, Oregon, Interpretation and Visitation Issues; Newsletter Design, Layout and Production

Mr. Roger Brandt
Chief of Interpretation, Oregon Caves National Monument, NPS, Cave Junction, Oregon, Interpretation; Newsletter Design, Layout and Production

Mr. John Roth
Natural Resource Specialist, Oregon Caves National Monument, NPS, Cave Junction, Oregon, Natural Resources Compliance Coordinator and Natural Resource Issues

Mr. John Cavin
Maintenance Worker Supervisor, Oregon Caves National Monument, NPS, Cave Junction, Oregon, Maintenance and Safety Issues

Mr. Gordon Atkins
Former Outdoor Recreation Planner, CCSO, NPS, Seattle, Washington, Environmental Impact Statement and National Environmental Protection Act (NEPA) Compliance Coordinator

Ms. Linda Baker
NEPA Compliance Program Leader, CCSO, NPS, Seattle, Washington, Environmental Impact Statement and NEPA Compliance Coordinator

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Ms. Dianne Croal
Landscape Architect, CCSO, NPS, Seattle, Washington, Design and Engineering, Design Concept Plan of Housing, Administrative and Maintenance Site

Ms. Cheryl Teague
Landscape Architect, CCSO, NPS, Seattle, Washington, Visual Analysis Issues; Draft GMP/EIS Layout, Design, and Production; Newsletter Editor

Consultants

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Ms. Emily McLuen
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Mr. Rick Wagner
Chief, Land Resources Program Center, CCSO, NPS, Seattle, Washington, Analysis of Lands Issues and Boundary Modification Issues

Mr. Wayne Hill
Realty Specialist, Land Resources Program Center, CCSO, NPS, Seattle, Washington, Analysis of Lands Issues and Boundary Modification Issues

Dr. Fred York
Anthropologist, CCSO, NPS, Seattle, Washington, Background Information on Tribal Groups

Mr. Joe Meiman
Hydrologist, Mammoth Cave National Park, Mammoth Cave, Kentucky, NPS, Consultant to Water Resource Division, Fort Collins, Colorado, Cave Hydrogeology Issues

Mr. Larry Martin
Hydrologist, Water Operations Branch, Water Resources Division, Fort Collins, Colorado, NPS, Water Quality Issues

Mr. Jeff Albright
Hydrologist, Water Rights Branch, Water Resources Division, Fort Collins, Colorado, NPS, Water

Rights Issues

Mr. Phil Pollard
Public Health Officer, CCSO, NPS, Seattle, Washington, Water Issues Related to Public Health

Mr. Ken Till
Fire Management Officer, CCSO, NPS, Seattle, Washington, Fire Issues

Mr. Steve Mark
Historian, Crater Lake National Park and Oregon Caves National Monument, NPS, Crater Lake, Oregon, Cultural and Historic Issues

Mr. Jim Thomson
Archeologist, CCSO, NPS, Seattle, Washington, Archeology Issues

Mr. Kent Bush
Curator, CCSO, NPS, Seattle, Washington, Curatorial Issues

Mr. Jim F. Milestone
NPS Representative, Regional Ecosystem Office, Portland, Oregon, Forestry Issues

Mr. Al Augustine
Fire Management Officer, Crater Lake National Park, NPS, Crater Lake, Oregon, Fire Management Issues

Mr. Alan Woodrow
Landscape Architect, Denver Service Center, NPS, Denver, Colorado, Road and Transportation Issues

Ms. Sandy Salisbury
Graduate Assistant, University of Washington, Seattle, Washington, Development Concept Plan for Parking Area and Entry, and Visitors Experience Map

Richard Engle
Operations Program Manager, CCSO, NPS, Seattle, Washington, Roads and Transportation Issues

Dick Gatten
Design Operations Engineer, Federal Highway Administration, Vancouver, Washington, Transportation Issues

Al Killian
Federal Highway Administration
Senior Geotechnical Engineer, Vancouver, Washington, Geotechnical Issues Relating to Structures

Geoff Swan
Team Leader, Design and Engineering, CCSO, NPS, Seattle, Washington, Roads and Transportation Issues

Other Cooperating Entities

Mr. Thomas K. Link
Timber Program Manager, USFS, Siskiyou National Forest, Grants Pass, Oregon, Timber Issues and Information

Mr. Don L. McLennan
Assistant Recreation Staff, USFS, Siskiyou National Forest, Grants Pass, Oregon, Recreation Information

Mr. Rodney Mace
Landscape Architect, USFS, Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, Washington, Visual Analysis Issues

Ms. Mary Smelcer
Applegate District Ranger, USFS, Rogue River National Forest, Jacksonville, Oregon, Grazing Information

Ms. Liz Agpaoa
Chief of Planning, USFS, Siskiyou National Forest, Grants Pass, Oregon, Planning Information

Ms. Mary Zuschlag
Siskiyou District Ranger, USFS, Siskiyou National Forest, Cave Junction, Oregon, Forest Issues

Mr. Tom Lavagnino
Planner, USFS, Rogue River National Forest, Jacksonville, Grazing Allotment Information

Mr. Mike Cooley
Recreational Lands and Mineral Staff Officer, USFS, Siskiyou National Forest, Grants Pass, Oregon, Mineral and Mining Information

Ms. Sue Vrilakas
Oregon Natural Heritage Program, Oregon State Lands Department and The Nature Conservancy, Portland, Oregon, T&E Species Information

Ms. Connie Levesque
Oregon Natural Heritage Program, Oregon State Lands Department and The Nature Conservancy, Portland, Oregon, T&E Species Information

Mr. Don Lyke
GIS Coordinator, USFS, Siskiyou National Forest, Grants Pass, Oregon, GIS Data

Ms. Debbie Kroeger
GIS Analyst, USFS, Siskiyou National Forest,, Grants Pass, Oregon, GIS Data

Ms. Dorothy Garner
GIS Coordinator, USFS, Illinois Valley Ranger District, Cave Junction, Oregon, GIS Data

Ms. Jean Crawford
Former Executive Director, Siskiyou Regional Educational Project, Cave Junction, Oregon, Biodiversity Information

Mr. Robert Brothers
Forest Policy Analyst, Headwaters, Ashland, Oregon, Biodiversity and Wilderness Information

Mr. Pat Moran
Scenic Byways Coordinator, Oregon Department of Transportation, Salem, Oregon, Information on Scenic Historic Road Designation for Caves Highway

Mr. Dan McKay
Research and Monitoring, Regional Ecosystem Office, Portland, Oregon, Monitoring Information on the *Northwest Forest Plan* (Forestry Issues)

Mr. Bob Freimark
Assistant Regional Director, The Wilderness Society, Seattle, Oregon, Forestry Issues

Mr. Steve Campbell
Soil Scientist, Natural Resources Conservation Service, Portland, Oregon, Prime and Unique Farmland Classification for Josephine County, Oregon

Howell's Lewisia
(*Lewisia catyledon*)

List of Agencies, Organizations and Persons

List of Agencies, Organizations and Persons to Whom Copies of the GMP/EIS Were Sent

Federal Agencies and Officials

Advisory Council on Historic Preservation, Western Office of Project Review, Golden, CO
Bureau of Land Management, Medford District Office, Medford, OR
Environmental Protection Agency, Federal Facilities Coordinator, Seattle, WA
Honorable Bob Smith, U.S. Representative, Washington, DC
Honorable Gordon Smith, U.S. Senator, Washington, DC
Honorable Ron Wyden, U.S. Senator, Washington, DC
National Park Service, Buffalo National River, Harrison, AR
National Park Service, City of Rocks, Hagerman, ID
National Park Service, Columbia Cascades System Support Office, Seattle, WA
National Park Service, Crater Lake National Park, Resource Management Specialist, Crater Lake, OR
National Park Service, Craters of the Moon National Monument, Arco, ID
National Park Service, Cumberland Gap National Historical Park, Middlesboro, KY
National Park Service, Fort Clatsop, Astoria, OR
National Park Service, Historic American Buildings Survey, Washington, DC
National Park Service, Mammoth Cave National Park, Division of Science and Resources Management, Mammoth Cave, KY
National Park Service, Ozark National Scenic Riverways, Van Buren, MO
National Park Service, Pacific Great Basin System Support Office, San Francisco, CA
National Park Service, Redwood National Park, Crescent City, CA
National Park Service, Sequoia National Park, Arcata, CA
National Park Service, Southwest System Support Office, Santa Fe, NM
National Park Service, Whitman Mission National Historic Site, Walla Walla, WA
National Park Service, Wildlife and Vegetation Division, Washington DC
National Park Service, Yosemite National Park, Yosemite, CA
U.S. Department of the Interior, Office of Environmental Affairs, Portland, OR
U.S. Department of the Solicitor, Portland, OR
U.S. Fish and Wildlife Service, Portland, OR
U.S. Fish and Wildlife Service, Portland Field Office, Portland, OR
U.S. Forest Service, Blanchard Springs Caverns, Mountain View, AR
U.S. Forest Service, Galice Ranger Station, Grants Pass, OR
U.S. Forest Service, Illinois Valley Ranger District, Siskiyou National Forest, Cave Junction, OR
U.S. Forest Service, Mt. St. Helen's National Monument, Ariel, WA
U.S. Forest Service, Rogue River National Forest, Medford, OR
U.S. Forest Service, Siskiyou National Forest, Grants Pass, OR
U.S. Forest Service, Tongass National Forest, Ketchikan, AK

State and Local Agencies and Officials

City of Cave Junction, Cave Junction, OR
Forrestville State Park, Preston, MN
Governor John Kitzhaber, Salem, OR
Idaho Department of Education, Western Regional Environmental Education Council, Boise, ID
Illinois Valley Chamber of Commerce, Cave Junction, OR
Josephine County Commissioner, Grants Pass, OR
Josephine County Planning Department, Grants Pass, OR
Kartchner Caverns State Park, Phoenix, AZ
Mayor of Cave Junction, Cave Junction, OR
Minnesota State Parks, Forestville State Park, Preston, MN
Onondaga Cave State Park, Leasburg, MO
Oregon Department of Agriculture, Salem, OR
Oregon Department of Environmental Quality, Portland, OR
Oregon Department of Fish and Wildlife, Tillamook, OR
Oregon Natural Heritage Program, Oregon Field Office, Portland, OR
Oregon Natural Heritage Data Base, Portland, OR
Oregon Parks and Recreation Department, Salem, OR
Oregon State Historic Preservation Officer, Salem, OR
Oregon State Historic Preservation Officer, Policy and Planning Division, Salem, OR
Seattle Parks and Recreation Department, Seattle, WA
State Representative, Eldon Johnson, Salem, OR
State Representative, Robert Repine, Salem, OR
State Senator, Honorable Brady Adams, Grants Pass, OR

Tribes

Confederated Tribes of Grand Ronde Community of Oregon
Siletz Tribal Council

Organizations

American Cave Conservation Association, Horse Cave KY
Audubon Society, Siskiyou Chapter, Grants Pass, OR
Bat Conservation International, Austin, TX
Cave Research Foundation, Portland, OR
Center for Field Research, Watertown, MA
Friends of the Earth, Washington DC
Green Earth Foundation, Fairfax, CA
Headwaters, Ashland, OR
Historic Preservation League of Oregon, Portland, OR
Josephine County Historical Society, Grants Pass, OR
Josephine County Historical Society Research Library, Grants Pass, OR
Klamath/Siskiyou Coalition, Cave Junction, OR
National Parks and Conservation Association, Pacific Northwest Regional Office, Seattle, WA

National Parks and Conservation Association, Washington, DC
National Speleological Society, Fredericksburg, VA
National Trust for Historic Preservation, Portland, OR
National Wildlife Federation, Vienna, VA
Oregon Environmental Council, Portland, OR
Oregon Historical Society, Portland, OR
Oregon Native Plant Society, Portland, OR
Oregon Natural Resources Council, Eugene, OR
Oregon Natural Resources Defense Council, Portland, OR
Oregon Wildlife Federation, Springfield, OR
Public Employees for Environmental Responsibility, Washington DC
Sierra Club, Rogue Group, Ashland, OR
Sierra Club, San Francisco, CA
Siskiyou Regional Educational Project, Cave Junction, OR
Student Conservation Association Inc., Charlestown, NH
The Nature Conservancy, Oregon Field Office, Portland, OR

Business/Industry

Balin, Lionel, Lockheed, Palo Alto, CA
Crater Lake Lodge, White City, OR
Estey Corporation, Portland, OR
JRH Transportation Engineering, Eugene, OR
Jeanne Lawson Associates, Portland, OR
J. Gervais and Associates, Governmental Relations, Salem, OR
Oregon Caves Company, Cave Junction, OR
Ozark Underground Laboratories, Protem, MO

Schools/Libraries/Institutions

Lorna Byrne Middle School, Cave Junction, OR
Northwestern University, Center for Urban Affairs and Policy Research, Evanston, IL
Oregon State University, College of Forestry, Corvallis, OR
Oregon State University, Cooperative Park Study Unit, Corvallis, OR
Oregon State University, Oregon Cooperative Wildlife Research Unit, Corvallis, OR
San Francisco State University, Geography Department, San Francisco, CA
Southern Oregon State College, Department of Biology, Ashland, OR
Thomas Burke Memorial Washington State Museum, University of Washington, Seattle, WA
University of Kentucky, Department of Geography, Lexington, KY
University of Michigan, Department of Biology, Ann Arbor, MI
University of Michigan, Department of Chemical Engineering, Ann Arbor, MI
University of Nebraska, Department of Biology, Omaha, NE
University of Washington, College of Forest Ecology, Seattle, WA
University of Wisconsin, Department of Geography, La Cross, WI
Wildlife Images, Grants Pass, OR

Media

Associated Press, Grants Pass, OR
Grants Pass Daily Courier, Grants Pass, OR
High Country News, Paonia, CO
Oregon Grotto, Vancouver, WA
Oregon Parks Magazine, Florence, OR
Willamette Valley Grotto, Portland, OR

Private Individuals

163 Individuals

Waldo Rock Cress
(*Arabis aculeolata*)

Appendices

Appendices

Appendix A: Oregon Caves National Monument Proclamation and 1978 Boundary Change

Appendix B: National Park Service Mission Goals

Appendix C: Letter, Section 7 Consultation with U.S. Fish and Wildlife Service, Endangered Species Act

Appendix D: Letters, 106 Compliance with Oregon State Historic Preservation Officer and Advisory Council on Historic Preservation

Appendix E: Pertinent Laws, Policy, and Procedures

Appendix F: Analysis of Boundary Adjustment and Land Protection Criteria

Appendix G: Supplemental Bibliography

Appendix H: Acronyms/Glossary

Appendix A: Oregon Caves National Monument Proclamation and 1978 Boundary Change

Appendix A

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

(No. 876 - July 12, 1909 - 36 Stat. 2497)

WHEREAS, certain natural caves, known as the Oregon Caves, which are situated upon unsurveyed land within the Siskiyou National Forest in the State of Oregon, are of unusual scientific interest and importance, and it appears that the public interests will be promoted by reserving these caves with as much land as may be necessary for the proper protection thereof, as a National Monument;

NOW THEREFORE, I, William Howard Taft, President of the United States of America, by virtue of the power in me vested by section two of the Act of Congress, approved June eighth, nineteen hundred and six, entitled, "An Act For the preservation of American antiquities," do proclaim that there are hereby reserved from all forms of appropriation under the public land laws, subject to all prior valid adverse claims, and set apart as a National Monument, all the tracts of land in the State of Oregon shown as the Oregon Caves National Monument on the diagram forming a part hereof.

The reservation made by this proclamation is not intended to prevent the use of the lands for National Forest purposes under the proclamations and Executive Order establishing the Siskiyou National Forest, but the two reservations shall both be effective on the land withdrawn, but the National Monument hereby established shall be the dominant reservation, and any use of the land which interferes with its preservation or protection as a National Monument is hereby forbidden.

Warning is hereby given to all unauthorized persons not to appropriate, injure, remove or destroy any feature of this National Monument, or to locate or settle on any of the lands reserved by this proclamation.

IN WITNESS THEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

DONE At the City of Washington this 12th day of July in the year of our Lord one thousand nine hundred and nine, and of the (seal) Independence of the United States the one hundred and thirty-fourth.

Wm. H. Taft.

By the President:
P.C. Knox,
Secretary of State

Appendix A

PUBLIC LAW 95-625 - NOV. 10, 1978

TITLE III - BOUNDARY CHANGES

Sec. 301. The boundaries of the following units of the National Park System are revised as follows, and there are authorized to be appropriated such sums as may be necessary, but not exceed the amounts specified in the following paragraphs for acquisitions of lands and interests in lands within areas added by reason of such revisions:

(14) Oregon Caves National Monument, Oregon: To add approximately eight acres as generally depicted on the map entitled "Oregon Cave, Oregon," numbered 20,000, and dated April, 1978: $107,000.

Appendix B: National Park Service Mission Goals

National Park Service Mission Goals

The following goal statements are taken from the 1997 *National Park Service Strategic Plan*. These "mission goals," as they are called, articulate the ideals that the NPS is striving to attain. These goals also provide the basis or cornerstone from which to develop long-term goals which is a key element of the *NPS Strategic Plan*, and NPS compliance with the Government Performance and Results Act (GPRA).

Goal Category I: Preserve park resources

Mission Goal 1a: Natural and cultural resources and associated values are protected, restored, and maintained in good condition and managed within their broader ecosystem or cultural context.

Mission Goal 1b: The NPS contributes to knowledge about natural and cultural resources and associated values; management decisions about resources and visitors are based on adequate scholarly and scientific information.

Goal Category II: Provide for the public enjoyment and visitor experience of parks

Mission Goal IIa: Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

Mission Goal IIb: Park visitors and the general public understand, appreciate, and support the preservation of parks and their resources for this and future generations.

Goal Category III: Strengthen and preserve natural and cultural resources and enhance recreational opportunities managed by partners.

Mission Goal IIIa: Natural and cultural resources are conserved through formal partnership programs.

Mission Goal IIIb: Through formal partnerships with other federal, state, and local agencies, and nonprofit organizations, a nationwide system of parks, open space, rivers and trails provides educational, recreational, and conservation benefits for the American people.

Mission Goal IIIc: Assisted through federal funds and programs, the protection of recreation resources is achieved through formal mechanisms to ensure continued access for public recreational use.

Goal Category IV: Ensure Organizational Effectiveness

Mission Goal IVa: The NPS uses current management practices, systems, and technologies to accomplish its mission.

Mission Goal IVb: The NPS increases its managerial resources through support from other agencies, organizations, and individuals.

Appendix C: Letter, Section 7 Consultation with U.S. Fish and Wildlife Service, Endangered Species Act

MARCH 3, 1849

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon State Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179 FAX: (503) 231-6195

March 21, 1996

In reply refer to:
1-7-96-SP-159

Marsha Davis
National Park Service
909 First Avenue
Seattle, WA 94104-1060

Dear Ms. Davis:

This is in response to your letter, dated 26 February 1996, requesting information on listed and proposed endangered and threatened species that may be present within the area of the Oregon Caves National Monument General Management Plan in Josephine County. The U.S. Fish and Wildlife Service (Service) received your letter on 28 February 1996.

We have attached a list (Attachment A) of threatened and endangered species that may occur within the area of the Oregon Caves National Monument. The list fulfills the requirement of the Service under section 7© of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). National Park Service (NPS) requirements under the Act are outlined in Attachment B.

The purpose of the Act is to provide a means whereby threatened and endangered species and their ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, NPS is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in NEPA (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Attachment B, as well as 50 CFR 401.12.

If NPS determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, NPS is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Attachment A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published February 28, 1996, in the Federal Register (Vol. 61, No. 40, 7596) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to project completion. Species of concern are those species for which the Service has information indicating possible relevance for listing, but for which further information is still needed.

If a proposed project may affect candidate species or species of concern, NPS is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends addressing potential impacts to these species in order to prevent future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, NPS may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages NPS to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Scott Center at (541) 957-3472. For questions regarding anadromous fish, please contact National Marine Fisheries Service, 525 NE Oregon St., Suite 500, Portland, Oregon 97232, (503) 230-5400. All correspondence should include the above referenced file number.

Sincerely,
Gary S. Miller
for Russell D. Peterson
State Supervisor

Attachments
SP 159
cc: PFO-ES
ODFW (nongame)

ATTACHMENT A

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED OREGON CAVES GENERAL MANAGEMENT PLAN

1-7-96-SP-159

LISTED SPECIES[1/]

Birds

Peregrine falcon	*Falco peregrinus*	LE
Bald eagle	*Haliaeetus leucocephalus*	LT
Northern spotted owl	*Strix occidentalis caurina*	CH LT

PROPOSED SPECIES[2,3/]

Fish

Coho salmon	*Oncorhynchus kisutch*	**PT
Documented Illinois River (Cave Junction)		
Klamath Mountains Province steelhead	*Oncorhynchus mykiss*	**PT
Documented Illinois River (Cave Junction)		

CANDIDATE SPECIES[/]

None

SPECIES OF CONCERN

Mammals

California wolverine	*Gulo gulo luteus*
Pacific fisher	*Martes pennanti pacifica*
Long-eared myotis (bat)	*Myotis evotis*
Fringed myotis (bat)	*Myotis thysanodes*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
Pacific western big-eared bat	*Plecotus townsendii townsendii*

Birds

Little willow flycatcher	*Empidonax traillii brewsteri*

Attachment A, Page 2

Amphibians and Reptiles

Tailed frog	*Ascaphus truei*
Northwestern pond turtle	*Clemmys marmorata marmorata*
Del Norte salamander	*Plethodon elongatus*
Siskiyou Mountains salamander	*Plethodon stormi*

Fish

Pacific lamprey	*Lampetra tridentata*

Plants

Howell's camas	*Camasia howellii*
Tall bugbane	*Cimicifuga elata*
Clustered lady's-slipper	*Cypripedium fasciculatum*
Elegant gentian	*Gentiana plurisetosa*
Howell's lewisia	*Lewisia cotyledon* var. *howelllii*
Slender meadow-foam	*Limnanthes gracilis* var. *gracilis*

(LE) - Listed Endangered *(LT) - Listed Threatened* *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered *(PT) - Proposed Threatened* *(PCH) - Critical Habitat has been proposed for this species*

(C)- Candidate: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened
*(*C) -Candidate: National Marine Fisheries Service designation for any species being considered by the Secretary for listing for endangered or threatened species, but not yet the subject of a proposed rule.*

Species of concern Species whose conservation status may be of concern to the Service. Includes taxa for which existing information may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

*** Consultation with National Marine Fisheries Service required*

1/ U. S. Department of Interior, Fish and Wildlife Service, August 23, 1993, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12.
2/ Federal Register Vol 60, No. 142, July 25, 1995, Proposed Rule-Coho salmon
3/ Federal Register Vol 60 No 51, March 16, 1995, Proposed Rule-Klamath Mountains Province steelhead

Appendix D: Letters, 106 Compliance with Oregon State Historic Preservation Officer and Advisory Council on Historic Preservation

United States Department of the Interior

NATIONAL PARK SERVICE
Columbia Cascades System Support Office
909 First Avenue
Seattle, Washington 98104-1060

IN REPLY REFER TO:

H30(CCSO-CR)

JUN 21 1996

Mr. Robert L. Meinen
Director
Oregon Parks and Recreation Department
1115 Commercial Street NE
Salem, Oregon 97310-1001

Dear Mr. Meinen:

In accordance with our responsibilities under the National Historic Preservation Act of 1966 and the amended Programmatic Agreement between the National Park Service, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, this letter is to keep you apprised of the General Management Plan (GMP) process for Oregon Caves National Monument in Oregon.

Enclosed is a copy of the final, approved, project agreement for the GMP and Environmental Impact Statement for Oregon Caves N.M. It is very similar to the draft agreement sent to you in early March of this year. It was prepared by Project Manager Keith Dunbar, with assistance by park staff. The agreement outlines a time frame for the ambitious project which will be undertaken over a two year period of time, roles and responsibilities, among other things.

The GMP team welcomes your input and interest in this project. Please do not hesitate to contact me or Keith Dunbar if you have any questions. I can be reached at 206-220-4138; Keith can be reached at 206-220-4101.

Sincerely,

Gretchen Luxenberg

Gretchen Luxenberg
Historian
System Support Office

Enclosure

cc: Supt, ORCA
Deputy ~~Associate~~ Field Director, PWFA

bcc: CCSO-RE, Mr. Dunbar
Supt, CCSO

March 3, 1849

United States Department of the Interior

NATIONAL PARK SERVICE
Columbia Cascades System Support Office
909 First Avenue
Seattle, Washington 98104-1060

IN REPLY REFER TO:

H30(CCSO-CR)

JUN 21 1996

Ms. Claudia Nissley, Director
Western Office of Project Review
Advisory Council on Historic Preservation
730 Simms Street, Room 401
Golden, Colorado 80401

Dear Ms. Nissley:

In accordance with our responsibilities under the National Historic Preservation Act of 1966 and the amended Programmatic Agreement between the National Park Service, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, this letter is to keep you apprised of the General Management Plan (GMP) process for Oregon Caves National Monument in Oregon.

Enclosed is a copy of the final, approved, project agreement for the GMP and Environmental Impact Statement for Oregon Caves N.M. It is very similar to the draft agreement sent to you in early March of this year. It was prepared by Project Manager Keith Dunbar, with assistance by park staff. The agreement outlines a time frame for the ambitious project which will be undertaken over a two year period of time, roles and responsibilities, among other things.

The GMP team welcomes your input and interest in this project. Please do not hesitate to contact me or Keith Dunbar if you have any questions. I can be reached at 206-220-4138; Keith can be reached at 206-220-4101.

Sincerely,

Gretchen Luxenberg

Gretchen Luxenberg
Historian
System Support Office

Enclosure

cc: Supt, ORCA
Deputy ~~Associate~~ Field Director, PWFA

bcc: CCSO-RE, Mr. Dunbar
Supt, CCSO

Appendix E: Pertinent Laws, Policies, and Procedures

Pertinent Laws, Policies, and Procedures

This section summarizes the laws, Executive Orders, NPS policies, and operational procedures related to the preparation of park planning documents. The following highlights those which are most pertinent to the planning for the future protection, use and management of Oregon Caves National Monument.

The National Park Service Organic Act

The NPS Organic Act of August 25, 1916 (16 USC 1), established the National Park Service. "The service thus established shall promote and regulate the use of the Federal areas known as national parks, ...by such means and measures as conform to the fundamental purpose of said parks, ...which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

National Parks and Recreation Act of 1978

Public Law 95-625, the National Parks and Recreation Act of 1978, requires the preparation and timely revision of general management plans for each unit of the National Park System. The NPS *Management Policies* (U.S. Department of the Interior 1988) calls for each GMP to "...set forth a management concept for the park [and] establish a role for the unit within the context of regional trends and plans for conservation, recreation, transportation, economic development, and other regional issues..." Congress has also specifically directed (16 U.S.C. 1a-7[b][4]) the NPS to consider, as part of the planning process, what modifications of external boundaries might be necessary to carry out park purposes.

General Authorities Act of 1970

This act defines the national park system as including "...any area of land and water now or hereafter administered by the Secretary of the Interior through the NPS for park, monument, historic, parkway, recreational, or other purposes:..." (16 USC 1c[a]). It states that "...each area within the national park system shall be administered in accordance with the provisions of any statute made specifically applicable to that area..." (16 USC 1c[b]) and in addition with the various authorities relating generally to NPS areas, as long as the general legislation does not conflict with specific provisions.

Redwood Act of 1978

The Redwood Act (16 USC 1a-1) in 1978 further states "...that these areas, though distinct in character, are united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage... The authorization of activities shall be construed and the protection, management, and administration of the areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as they have been or shall be directly and specifically provided by Congress."

National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966 (as amended) requires that proposals and alternatives relating to actions that could affect cultural resources, and the potential effects of those actions, be provided for review and comment by the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation. Therefore, this document will be submitted to the appropriate offices for review and comment according to procedures in 36 CFR Part 800 and delineated in the 1990 Programmatic Agreement signed by the NPS, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation.

Oregon Caves National Monument Proclamation

The presidential proclamation establishing Oregon Caves National Monument (No. 876—July 12, 1909—36 Stat. 2497) states that the Oregon Caves "...are of unusual scientific interest and importance, and it appears that the public interests will be promoted by reserving these caves with as much land as may be necessary for the proper protection thereof, as a National Monument;..."

The proclamation further states, "The reservation made by this proclamation is not intended to prevent the use of the lands for National Forest purposes under the proclamations and Executive Order establishing the SNF, but the two reservations shall both be effective on the land withdrawn, but the National Monument hereby established shall be the dominant reservation, and any use of the land which interferes with its preservation or protection as a National Monument is hereby forbidden."

Executive Orders 11988 and 11990

The objectives of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) are to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and wetlands. Application of the final NPS procedures for implementing those Orders will occur if a NPS proposal would affect a 100-year floodplain (500-year for critical actions), coastal high hazard zone, flash flood area, or wetland. If a proposed action involves adverse impacts to floodplain or wetland areas, a Statement of Findings (SOF) will be prepared that documents the rationale for the determination that there is no practicable alternative to locating in or impacting these areas. The SOF will be prepared for concurrence signature by the Chief, Water Resources Division (WRD), and approval by the Regional Director, Pacific West Region.

Endangered Species Act

Section 7 of the Endangered Species Act requires that when a project or proposal by a federal agency has the potential to impact a known endangered, threatened or candidate plant or animal species, that agency must enter into formal consultation with the U.S. Fish and Wildlife Service (USFW). The NPS *Management Policies* direct the NPS to give the same level of protection to state-listed species, as is given to federally listed species. Prior to implementing any development proposals at the Monument, the NPS will consult with the USFW to obtain species listings, and to ascertain the need to prepare a biological assessment of the proposed actions. Similar contact will be made with the appropriate state agencies if information on state-listed species is not available through the USFW.

National Environmental Policy Act of 1969

The National Environmental Policy Act of 1969 (NEPA) requires the preparation of either an environmental assessment (EA) followed with either a finding of no significant impact (FONSI) or an EIS, or an EIS without an EA, for all federal proposals that may have significant environmental and/or sociological impacts on park resources or adjacent areas.

A February 22, 1991 policy memorandum from the NPS's Associate Director for Planning and Development specifies that EISs are to be prepared in conjunction with general management plans. That position reinforces the policies and procedures of the Departmental Manual which state that EISs will be the normal rule in preparing GMPs rather than the exception. This EIS describes potential impacts that might result from implementation of any of the alternatives discussed. Following public and agency review of the draft and final EIS, the Superintendent, Deputy Regional Director, and the Regional Director of the NPS's Pacific West Region, will sign a Record of Decision indicating the alternative selected and the rationale for its selection. Implementation of the GMP may then proceed.

Executive Order 12898

Executive Order 12898 requires an analysis of impacts on low income populations and communities, as appropriate. The Department of the Interior's policy on environmental justice (No. ECM95-3) is based on this Executive Order and requires the NPS in all environmental documents to "...specifically analyze and evaluate the impacts of any proposed projects, actions, or decisions on minority and low income populations and communities, as well as the equity of the distribution of the benefits and risks of those decisions." If significant or no impacts are predicted on minority/low income populations, then this should be stated and the reasons given.

Federal Cave Resources Protection Act of 1988

The purpose of the 1988 Federal Cave Resources Protection Act is to secure, protect and preserve significant caves on federal lands for the benefit of the public. It was also enacted to encourage increased cooperation and exchange of information between governmental authorities and those who utilize caves located on federal lands for scientific, education, or recreational purposes. The act defines "significant" caves and gives criteria for a determination of significance. The NPS has determined that all caves occurring within the boundaries of units of the system are deemed to be significant.

Public Law 89-249

The Concessions Policy Act of 1965 (79 Stat. 969, 16 U.S.C. 20) applies to all concession contracts and permits issued within the National Park System. These authorizations typically cover rustic overnight lodging, food service, gift and retail sales, guide services, and other "necessary and appropriate" services to meet basic visitor needs at a given NPS unit. Rates for goods and services provided by concessioners are controlled by NPS personnel, who also evaluate the performance of operators. Satisfactory concessioners are rewarded with preferential rights to contract renewal.

National Park Service *Management Policies*

The NPS publication, *Management Policies* (1988), is the basic service-wide document that sets the framework and provides guidance for management of the National Park System. The *Management Policies* state that all parks are complex mixtures of values and resources, each with its own unique qualities and purposes, each requiring specific treatment in the development and implementation of management strategies and operational plans. However, the managers of all parks are required to apply policies in a consistent and professional manner to achieve the congressional mandate for management of the National Park System. General management planning is guided by these management policies.

Cave Management

NPS policies state that caves will be managed to perpetuate their atmospheric, geologic, biological, ecological and cultural resources in accordance with approved cave management plans (action plans appended to approved resource management plans). Natural drainage patterns, air flows, and plant and animal communities will be protected. Developments will be permitted only where necessary for general public use and when it's determined that development will not significantly alter any conditions perpetuating the natural cave environment or harm cultural resources. No potentially harmful development or use will be undertaken in, above, or adjacent to caves until it can be demonstrated that it would not significantly affect natural cave conditions, including subsurface water movements. Developments already in place above caves will be removed if they are significantly altering natural conditions.

Caves or portions of caves will be closed to public use, or use will be controlled, when such actions are required for human safety or the protection of cave resources. Some caves or portions of caves may be managed exclusively for research, with access limited to approved research personnel.

National Park Service Strategic Plan

The NPS publication, the *National Park Service Strategic Plan* (1997) includes the NPS mission statement, mission goals, and gives five-year long-term goals to help the agency measure performance and guide the allocation of available human and financial resources. The *NPS Strategic Plan* incorporates the requirements of the Government Performance and Results Act (GPRA).

In addition to servicewide strategic planning, staff at individual NPS units are required to also produce mission goals and a five-year strategic plan for their unit. In planning for parks, both strategic planning and general management planning share the need to articulate the purpose and significance of the park unit, and to define park mission goals in relationship to overall servicewide goals. In strategic planning, parks must translate mission goals into five-year long-term goals and allocate human and financial resources accordingly. In general management planning, which is provided for the Monument through this document, managers and park planners must insure that proposed actions in the plan are in harmony with park mission goals, and help to implement their various provisions by articulating actions and strategies which are utilized by park managers to guide the long term preservation and public use of the Monument.

Appendix F: Analysis of Boundary Adjustment and Land Protection Criteria

Analysis of Boundary Adjustment and Land Protection Criteria

As one of the provisions of Public Law 95-625, the National Parks and Recreation Act of 1978, Congress directed that the National Park Service consider, as part of a planning process, what modifications of external boundaries might be necessary to carry out Monument purposes. Subsequent to this act, Congress also passed Public Law 101-628, the Arizona Desert Wilderness Act. Section 1216 of this act directs the Secretary of the Interior to develop criteria to evaluate any proposed changes to the existing boundaries of individual park units. Section 1217 of the act calls for the NPS to consult with affected agencies and others regarding a proposed boundary change, and to provide a cost estimate of acquisition cost, if any, related to the boundary adjustment.

These legislative provisions are implemented Through NPS *Management Policies* which state that the NPS will conduct studies of potential boundary adjustments and may make boundary revisions:

- To include significant resources or opportunities for public enjoyment related to the purposes of the park
- To address operational and management issues such as boundary
- Identification by topographic or other natural features
- To protect park resources critical to fulfilling park purposes

NPS policies instruct that any recommendation to expand park boundaries be preceded by determinations that the added lands will be feasible to administer considering size, configuration, ownership, cost and other factors, and that other alternatives for management and resource protection have been considered and are not adequate.

The following is a review of the criteria for boundary adjustments as applied to Oregon Caves National Monument, and is included as supporting documentation for the proposed action (Alternative C) which includes a recommendation for two boundary changes. The first boundary change for the transfer of 3,310 acres would require congressional legislation. The second boundary change is an acreage deletion of 3.95 acres at the Illinois Valley Visitor Center (IVVC) and would be pursued as a minor boundary adjustment.

I. Boundary Change Proposal - Lake Creek and Upper Cave Creek Watersheds

(Transfer of 3,310 acres from Siskiyou National Forest to Oregon Caves National Monument)

1) Significant Resources or Opportunities for Public Enjoyment Related to the Purpose of Oregon Caves National Monument.

The transfer of the 3,310 acres of adjacent federal land within the SNF to the Monument are included in the proposed action because they are integral to the future management, protection and public use of Oregon Caves National Monument.

The proposed land transfer to the Monument contains the upper watershed of Cave Creek, and the upper and lower watersheds of Lake Creek which are integral to the protection of Monument resources and public use of the Monument. Regarding Cave Creek, dye-tracings have shown that upper Cave Creek is a primary source of recharge of the River Styx, the base-level stream of Oregon Caves. Since water is fundamental to both the origin and future development and decoration of Oregon Caves, the protection of the quantity and quality of water transfer through the karst aquifer, and from surface sources such as Cave Creek, is critical to the long-term protection of the cave.

Additionally, the upper watershed of Lake Creek flowing from Bigelow Lakes, is the source of the public water supply for the Monument, providing potable water to Monument visitors and employees. The boundary change would provide for the permanent protection of the public watershed. Bigelow Lakes are also the brooding site for tree frogs that range into the Monument to feed during their adult life. The role these amphibians play in the ecology of Oregon Caves National Monument may be important, especially where they are found in the Monument's serpentine meadows near Bigelow Lakes.

The boundary addition is topographically based, and thus would provide for viewshed protection of both Level I and II Sensitivity foreground viewsheds, and Level I Sensitivity middleground viewsheds from various viewpoints within the Monument and on adjacent public hiking and cross country ski trails. A greater percentage of middleground views would be included in Alternative C over the other alternatives within the revised boundary. (See Visual Analysis section in The Affected Environment chapter for breakdown of percentages for viewshed protection.)

The boundary transfer would perpetuate the opportunity for public use and enjoyment of public land areas for outdoor recreational activities such as hiking, nature study, picnicking, cross country skiing, and other uses.

The delineation of a topographic boundary would provide for more efficient management of the area and better define a public use area within the upper Cave Creek and Lake Creek watersheds, including the Bigelow Lakes area and Mt. Elijah. At the present time, trails traversing this area are in dual management between the NPS and the USFS. (Trails currently leave the Monument and traverse portions of the SNF in the Lake Creek and upper Cave Creek watersheds.) While a positive spirit of coordination is evident between the two agencies, distance factors, and reduced funding levels for trail management and maintenance have resulted in concerns about the long-term viability of those public hiking trails. In addition to these concerns, much of this forest area adjacent to the Monument has been historically managed for its timber production value and not for its scenic and recreational value. While management for Late-Successional Reserve characteristics will reduce the amount of timber harvesting over time, some thinning and timber salvage operations would be expected to continue if this area was not added to the Monument.

2) Operational and Management Issues Related to Access and Boundary Identification by Topographic or Other Natural Features

The present boundary of the Monument at 484 acres is significantly reduced from the 2,560 acres included in the original area withdrawn for study in 1907. The boundary currently established for the Monument is not topographically based, but instead is rectangular in shape, and does not take into account the steep terrain of the general area, which ranges in elevation from 3,680 feet to 5,480 feet. The current boundary configuration serves to compound difficulties in resource management and administration issues of the site due to the varied topography of the area. In many places, slopes exceed 100% greatly limiting both ease of access and possible locations for public and administrative facilities.

Therefore, the present size and rectangular configuration of the Monument at 484 acres is inadequate to provide for the long-term protection and public use of the Monument, and does not provide a logical topographical related boundary that makes sense from a land management perspective. The current Monument boundary does not ensure the long term protection of cave resources, nor does it ensure protection of the Lake Creek and upper Cave Creek watersheds, the potable water supply that serves both visitors and Monument and concession employees, the scenic foreground and middleground views as seen from various points within the Monument, or the protection of the forest ecology above and adjacent to the cave. The proposed boundary change would address all these current deficiencies by providing a watershed based boundary. The boundary change would also incorporate the Monument's administrative site, presently located within SNF, which would allow for more efficient administrative use and land management of this area.

3) Protection of Monument Resources and Fulfillment of Monument Purpose

The proposed boundary adjustments to Oregon Caves National Monument would help to fulfill the purposes for which Oregon Caves National Monument was established by President Taft. His July 18, 1909 proclamation setting aside the caves noted its "... unusual scientific interest and importance." The proclamation also states that "... the public interest will be promoted by reserving these caves with as much land as may be necessary for the proper protection thereof, as a National Monument."

The boundary change would enable Monument management to better meet their legal responsibilities for protection of Monument resources, including providing for the important protection of Monument's natural and visual resources and protection to the upper Lake Creek watershed which is the source of the Monument's public water supply. The boundary transfer would specifically assist in insuring that:

- Cave resources and subsurface hydrology are protected
- The Lake Creek and upper Cave Creek watersheds are protected
- The potable water supply serving Monument visitors and staff is protected
- The visual resources encompassing the scenic foreground and much of the middleground views as seen from the Monument are protected
- A logical topographic boundary for the Monument is established
- NPS management of the area is more efficient
- NPS capital investments are protected
- Outdoor recreational opportunities continue to be provided to the public

This boundary transfer would provide for the protection of the public water supply in the upper Lake Creek watershed, protection of surface and subsurface hydrological resources in the upper Cave Creek watershed, and protection of the foreground and most middleground views as seen from the present Monument. The NPS would provide interpretive opportunities in the Bigelow Lakes area through both personal and non-personal media to help visitors better understand and appreciate this special botanical resource. This option also provides a more complete topographic boundary for land management purposes, includes the existing administrative area, and provides some additional outdoor recreational opportunities through added trails linking the Monument to SNF day-use and campground sites down valley. Finally, two new unexplored caves both situated in the same marble outcrop as the Oregon Caves have been identified within the area. The stratigraphic position and proximity of these caves provide additional rationale for including this area within the Monument.

4) Feasibility to Administer the Lands Added through Boundary Adjustment

The proposed addition to the Monument is feasible for Oregon Caves National Monument to administer. The lands proposed for transfer are contiguous with the present Monument, and form a logical topographical boundary that provides for efficient management of the area. The Monument's current administrative site on USFS land would be incorporated into the boundary expansion allowing for more efficient administrative use and NPS land management. Much of the added land is either accessible by road or trail, and much of the area is within the viewshed as seen from present Monument lands. With an increase in staff, management of the Monument has the full capability to administer the lands proposed for transfer to the Monument. In order to best manage these lands, staff increases are proposed in this GMP in the areas of resource management, law enforcement and maintenance. Resource management personnel would be involved in fire management, wildlife management and other activities. Maintenance personnel would maintain non-motorized trails in the expanded Monument. The NPS operates and maintains several facilities, buildings, and trails within the proposed area.

5) Protection Alternatives Considered

In addition to Alternative C, other protection alternatives were considered. Alternative D would involve the transfer of 2,853 acres to the Monument from SNF to protect the public water supply in the upper Lake Creek watershed and the upper Cave Creek subsurface hydrology. In addition, a designated 937 acre protected area within the SNF would remain under SNF management for protection of the scenic viewsheds for a total of 3,310 acres.

Also considered in Alternative B would be a protected area of 3,310 acres whereby land management would remain within the SNF, with a permanent set-aside of the area in a special protective land management category through written cooperative agreement between the USFS and the NPS.

The proposed boundary addition was selected because it is a logical and efficient management unit that provides for the long-term protection of Monument resources, adds the Monument's administrative site to the boundary, and provides outdoor recreation benefit to the public with minimal impact on surrounding SNF lands which are predominately managed for multiple use. It also minimizes economic hardship on Josephine County and the timber industry since (1) no private lands are involved, and (2) all lands added to the Monument from within the SNF are managed within the LSR which restricts timber extraction to limited thinning and salvage operations and does not count LSR managed lands within the national forest's general timber quotas. Furthermore, the proposed boundary was selected because it is topographically based, and provides for a more efficient management of public lands between the NPS and the USFS. Finally, all the land area proposed for inclusion in the Monument are federal lands administered by the USFS, and management can be transferred at no land cost to the Federal Government. No private or State of Oregon lands are included in the proposal.

(6) Proposed Additions to the Monument Boundary and Other Adjustments

Under the proposed action, 3,310 acres are proposed for inclusion within the boundary of Oregon Caves National Monument. Congressional authorization would be required to adjust the Monument boundary and transfer management of the land from the SNF to the Monument. Management of both the surface and subsurface mineral estate would be transferred under the proposal. Most existing forest roads would be retained after the transfer, and would continue to be maintained by the SNF under written agreement with the National Park Service. The only road closure would be a section of USFS Road 070 (from its intersection with USFS Road 079 to its terminus near the eastern boundary of the Monument and USFS Trail 1206) located in the upper Lake Creek watershed in order to provide further protection to the public water supply.

Other than some expected administrative costs to carry out the transfer, no land costs would result to the Federal Government under this proposal. As described earlier, there would be no reduction in federal payments to Josephine County resultant from future restrictions on timber harvesting in the area added to the Monument. Payment in lieu of taxes would continue to be paid to Josephine County.

II. Boundary Change Proposal - Illinois Valley Visitor Center, Cave Junction

(A proposal to delete 3.95 acres from the 7.98 acres authorized by Congress in 1978.)

1) Significant Resources or Opportunities for Public Enjoyment Related to the Purpose of Oregon Caves National Monument.

While 7.98 acres was authorized by Congress in 1978 for the purposes of establishing an information/visitor center in the community of Cave Junction, only 4.03 acres are currently in public ownership today. The existing site is adequate to provide the land necessary for the location of the visitor center, along with the associated parking, landscaping and open space buffer. The remaining 3.95 acres of land was sold by the Federal Government in 1980. The site is now owned by the City of Cave Junction and will be developed for a water treatment plant.

Deletion of the 3.95 acres from the authorized site in Cave Junction will not diminish the opportunities for the public to gain information and orientation services at the present. The parking area adjacent to the center is currently underutilized, even during the peak season, and has adequate capacity to accommodate growth in visitor use of the site. Space in the existing parking area is also adequate for the vehicles of NPS, concession and cooperating association staff who reside in the area and who carpool, or would utilize the proposed employee shuttle between Cave Junction and the main portion of the Monument.

2) Operational and Management Issues Related to Access and Boundary Identification by Topographic or Other Natural Features

The deletion of the 3.95 acres from the Monument boundary will not result in any operational or management issues for the staff. Modest enhancements could be made to the existing open space buffer between the IVVC and the proposed municipal water treatment plant through plantings of native conifers which would provide a year-round vegetative screen and physically separate visitor services from future municipal facilities.

3) Protection of Monument Resources and Fulfillment of Monument Purpose

The proposed deletion will have no effect on the protection of Monument resources and much of the land area deleted provides a public benefit to the people of Cave Junction. The portion of the site already in federal ownership fulfills the purpose Congress intended for this Monument addition as a location for a joint information and orientation center.

4) Feasibility to Administer the Lands Added through Boundary Adjustment

Not applicable.

5) Protection Alternatives Considered

Consideration was given to retaining the acres within the Monument boundary. However, since the land has been bought by the City of Cave Junction, any consideration for purchase by the NPS would not be a prudent use of public funds. Additionally, the land is not needed for Monument purposes.

6) Proposed Additions to the Monument Boundary and Other Adjustments

A deletion of 3.95 acres from the Monument boundary is proposed from the total of 7.98 acres that was authorized by Congress at Cave Junction.

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Appendix H: Acronyms/Glossary

Acronyms/Glossary

Administratively Withdrawn Areas	Areas removed from the suitable timber base through agency direction and land management plans.
Affected Environment	The natural, physical, and human-related environment that is sensitive to changes due to proposed actions.
Allocation	The USFS assignment of management prescriptions to specific land areas to achieve the goals and objectives of an alternative.
Alternative	The mix of management prescriptions and land allocations applied to specific land areas to achieve a set of goals and objectives.
Anadromous Fish	Species of fish which mature in the ocean and migrate into streams to spawn.
BLM	Bureau of Land Management. An agency within the U.S. Department of the Interior.
Back-arc Basin	One of several topographic features sometimes associated with a subduction zone. It is a shallow to moderately deep ocean basin geographically located between a continent and a volcanic island arc. Volcanic activity behind a volcanic arc (opposite side of arc from the deep ocean subjection trench) separates the arc from the continent, simultaneously forming a volcanic island chain and back-arc basin. Marine sedimentary rocks are associated with the volcanic rocks. The Seas of Japan, Okhotsk, and Bearing fill modern-day examples of back-arc basins.
Biological Diversity	The distribution and abundance of different plant and animal communities and species over time and space.
Botanical Area	An area which has been designated by the USFS as containing specimens or groups of plants, and plant communities which are significant because of form, color, occurrences, habitat, location, life history, arrangement, ecology, environment, rarity and/or other features.
CCC	Civilian Conservation Corps.
CFR	Code of Federal Regulations. The listing of various regulations pertaining to management and administration of the NPS and other federal agencies.
Canopy	The uppermost spreading, branchy layer of a forest.
Canopy Closure	The progressive reduction in space between tree crowns as they spread laterally; a measure of the percent of potential open space occupied by the collective tree

	crowns in a stand.
Carrying Capacity	The type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that complement the purposes of the park and its management objectives. It is affected by both physical constraints and the more subjective perceptions of what constitutes a quality recreation experience.
Class I Areas	Special areas (National Parks, certain wilderness areas) protected for their air quality related values.
Clearcutting	The harvesting of an entire stand of trees in one cutting operation, leading to the establishment of an even-aged stand.
Climax	The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.
Commercial Thinning	Timber sales which call for selective harvest in immature stands designed to improve the quality and growth of the remaining trees.
Congressionally Reserved Areas	Areas that require Congressional enactment for their establishment, such as National Parks, Wild and Scenic Rivers, National Recreation Areas, National Monuments, and Wilderness.
Critical Habitat	The habitat designated by the Secretary, USDI, as critical to the continued survival of threatened or endangered species.
Cultural Resources	Buildings, sites, areas, architecture, memorials and objects having scientific, prehistoric, historic, or social values.
Cumulative Impacts	Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.
DCP	Development Concept Plan.
Debris Flow	A rapid moving mass of rock fragments, soil, and mud, with more than half of the particles being larger than sand size.
Diffuse Autogenic	Locally derived.
Disturbance	A force that causes significant change in structure and/or composition through natural events such as fire, flood, wind, or earthquake; mortality caused by insect or disease outbreaks, or by human-caused events, such as the harvest of forest products.

Domestic or Public Water Supply	Water used for human consumption.
Drainage	An area mostly bounded by ridges or other similar topographic features, encompassing part, most, or all of a watershed.
EA	Environmental Assessment. A concise public document which serves to do the following: briefly provide sufficient evidence and analysis for determining whether to prepare an EIS or a Finding of No Significant Impact, aid an agency's compliance with NEPA when no EIS is necessary, and facilitate preparation of an EIS when necessary.
EIS	Environmental Impact Statement. A detailed statement prepared by the responsible official in which a major federal action which significantly affects the quality of the human environment is described, alternatives to the proposed action provided, and effects analyzed.
EMS/SAR	Emergency medical supplies and search and rescue equipment.
EPA	Environmental Protection Agency. An independent agency of the U.S. government.
Edge Effect	The increased richness of flora and fauna resulting from the mixing of two communities where they join, as at the edge of a meadow .
Effects	Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.
Endangered Species	Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range (Endangered Species Act of 1973).
Endemic Species	A species whose natural occurrence is confined to a certain region and whose distribution is relatively limited.
Exotic Species	Species that are not native to an area.
FTE	Full Time Equivalent.
Forest Fragmentation	The creation of habitat islands through land development or through natural causes, such as fire.
Fuel Loading	The amount of combustible material present per unit of area, usually expressed in tons per acre.
Full Retention	

Visual	A visual quality objective of the USFS. USFS management activities are not evident to the casual forest visitor.
GIS	Geographic Information System. A computer system capable of storing and manipulating spatial mapped data.
GMP	General Management Plan. NPS lead planning document required for all units of the national park system.
GPRA	Government Performance and Results Act.
Granitic	Any light-colored, coarse-grained rock formed at considerable depth by crystallization of molten rock.
Hazardous Materials	Anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.
Helicopter Logging	Use of helicopters to transport logs from where they are felled to a landing.
IMPLAN	An economic impact modeling procedure developed by the USFS.
IVVC	Illinois Valley Visitor Center located in Cave Junction, Oregon. Visitor center for Oregon Caves National Monument.
Intermittent Stream	Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.
Irretrievable	Applies to losses of production, harvest, or use of renewable natural resources. For example, where production is lost, the action is irretrievable, but not irreversible.
Irreversible	Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long time periods; also includes loss of future options.
Karst	Karst is a geologic terrain characterized by distinct surface topography and subsurface features with interrelated hydrologic and chemical processes. Karst forms by dissolution of carbonate rocks (limestone, dolomite, marble) and sulfate rocks (gypsum). Gypsum, a hydrated mineral, readily dissloves in pure water. Carbonate minerals dissolve more easily in acidified water. Atmospheric carbon dioxide naturally mixed in rain water is sufficiently acidic to dissolve carbonate rocks. The resultant topography and underlying features may include sinkholes, caves, disappearing streams, springs, and a sharply serated weathered rock surface. Solutionally enlarged fractures create underground drainage channels that capture surface streams; and surface watersheds are often hydrologically connected via this

	underground network. Karst forms in humid regions, but relict karst may be found in currently arid regions.
Key Watershed	As defined by the National Forest and Bureau of Land Management District fish biologists, a watershed that contains habitat for potentially threatened species or stocks of anadromous salmonids or other potentially threatened fish; or greater than 6 square miles with high-quality water and fish habitat. According to the *Northwest Forest Plan,* key watersheds are intended to function as fish habitat refuges and as sources of high water quality.
LRMP	Land and Resource Management Plan. USFS lead planning document for national forests.
LSR	Late-Successional Reserves. A forest in its mature and/or old-growth stages. They are the largest single management category established by the *Northwest Forest Plan*. The overall management direction for LSRs is to protect and enhance conditions of late-successional and old-growth forest ecoststems. Limited salvage and thinning operations are allowed following adoption of an LSR management assessment. Watershed analysis and restoration are important features of LSRs since almost one-half of LSRs are Key watersheds.
Large Woody Debris	Pieces of wood larger than 10 feet long and 6 inches in diameter, in a stream channel.
MOU	Memorandum of Understanding. An formal, written agreement between agencies.
Management Zones	NPS designated zones depicting where a predominant use/uses would best fulfill management objectives and achieve the purposes of the park.
Matrix	Federal lands outside of reserves, withdrawn areas, and Managed Late-Successional areas. Matrix lands are generally considered available for logging and other management activities.
Mesic	Pertaining to or adapted to an area that has a balanced supply of water; neither wet nor dry.
Mixed-Conifer Forest	A forest community that is dominated by two or more coniferous species.
Monument	Oregon Caves National Monument.
Multiple Use	Management of all the various renewable surface resources of a national forest so that they are utilized in the combination that will best meet the needs of the public. There should be harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land . Consideration is given to the relative values of the various resources, and not necessarily to the combination of uses that will give the greatest dollar return or the

	greatest unit output.
NAAQS	National Ambient Air Quality Standards. Standards designed to protect public health and welfare, allowing an adequate margin of safety. For particulate matter less than 10 microns in size (PM_{10}), 50 micrograms per cubic meter annual average and 150 micrograms per cubic meter, 24-hour average, not to be exceeded more than once per year.
NEPA	National Environmental Policy Act . An act passed in 1969 setting a national policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality.
NPS	National Park Service. A division within the U.S. Department of the Interior overseeing the national park system.
NEPA Process	An interdisciplinary process, mandated by the NEPA, which concentrates decisionmaking around issues, concerns, alternatives and the effects of alternatives on the environment.
NHL	National Historic Landmark.
NRA	National Recreational Area.
NRCS	Natural Resource Conservation Service (former Soil Conservation Service).
National Register of Historic Places	A formal list established by the National Historic Preservation Act of 1966 of cultural resources worthy of preservation. The Register is maintained by the National Park Service and lists archaeological, historic, and architectural properties.
Nonattainment	Failure of a geographic area to attain or maintain compliance with National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act (1990 revision).
Northern Spotted Owl	One of three subspecies of the spotted owl (Strix occidentalis caurina) that ranges from southern British Columbia, Canada, through western Washington and Oregon, and into northwestern California. Listed as a threatened species by the U.S. Fish and Wildlife Service.
ORV	Off Road Vehicle. A vehicle capable of cross-country travel or travel on low-standard roads and trails.
Old-Growth Associated Species	Plant and animal species that exhibit a strong association with old-growth forests.

Old-Growth Dependent Species	An animal species so adapted that it can exist only in old-growth forests.
Old-Growth Forest	A forest stand usually at least 180-220 years old with moderate to high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood; numerous large snags; and heavy accumulations of wood, including large logs on the ground.
Oligotrophic Streams	Oxygen rich, nutrient poor streams.
Organics	Organic material inadvertently brought into the cave that can affect the distribution of macroinvertebrates, bats, and wall bacteria.
Partial Retention Visual	A visual quality objective of the USFS. USFS management activities may be evident but must remain subordinate to the characteristic landscape.
Perennial Streams	Streams which normally flow throughout the year.
Permittee	A holder of a permit to use public land or resources for a specific purpose.
Prescribed Fire	Intentional application of fire, of either planned or unplanned ignitions, to accomplish certain planned objectives.
Primitive	A USFS recreation classification. An area characterized by essentially unmodified natural environment of a size or location that provides the opportunity for isolation from sights and sounds of people. Motorized use within the area is normally not permitted.
Programmed Harvest	Timber scheduled for harvest for a specific time period.
Public Water System	A system providing piped water for public consumption.
REO	Regional Ecosystem Office, interagency team whose role is to implement the *Northwest Forest Plan*.
RRNF	Rogue River National Forest. The national forest located to the east of Siskiyou National Forest.
RV	Recreational Vehicle.
Rare	Plant or animal species which are uncommon in a specific area. All endangered, threatened, and sensitive species can be considered rare, but the converse is not true.
Reforestation	The natural or artificial restocking of an area with forest trees; includes measures to obtain natural regeneration, as well as tree planting and seeding. The work is done

	on national forests to produce timber and other forest products, protect watershed function, prevent erosion, and improve the social and economic values of the forest, such as wildlife, recreation, and natural beauty.
Regeneration	The renewal of a tree crop, whether by natural or artificial means. Also the young tree crop (seedlings and saplings) itself.
Regeneration Harvest	Timber harvest conducted with the partial objective of opening a forest stand to the point where favored tree species will be reestablished. Similar to a clearcut but leaving one to several seed trees/acre.
Reserved Land	Federal lands that have been withdrawn from acreage used for timber yields. These lands often have a preservation or protection status. Wildernesses, Research Natural Areas, and National Recreation Areas are examples of reserved lands.
Riparian Areas	Terrestrial areas where the vegetation and microclimate are influenced by perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics; this habitat is transitional between true bottom land wetlands and upland terrestrial habitats and, while associated with water courses, may extend inland for considerable distance.
Riparian Reserves	Designated riparian areas found outside the Late-Successional Reserves.
SCA	Student Conservation Association.
SHPO	State Historic Preservation Office. The state official authorized to act as a liaison to the Secretary of the Interior for purposes of implementing the National Historic Preservation Act of 1966.
SNF	Siskiyou National Forest. A unit of the national forest system surrounding Oregon Caves National Monument.
SOF	Statement of Findings.
Salmonid	Member of the fish family salmonidae; includes salmon and trout.
Salvage	Removal of recently-dead or dying trees to minimize the loss of wood products.
Scoping	The procedures by which the NPS determines the extent of analysis necessary for a proposed action, for example, the range of actions, alternatives, and impacts to be addressed, identification of significant issues related to a proposed action, and establishing the depth of environmental analysis, data, and task assignments needed.
Section 7	The section of the Endangered Species act that specifies the roles of interagency coordination in accomplishing the objective of species recovery.

Seed Tree	A tree selected, and often reserved for see collection.
Selection Cutting	The annual or periodic removal of trees, individually or in small groups, from an uneven-aged forest in order to realize yield and establish a new stand of irregular constitution.
Sensitive Species	Those plant and animal species for which population viability is a concern as evidenced by significant current or predicted downward trends in population numbers or density, or habitat capability that would reduce a species' existing distribution.
Serpentine	A mineral or rock (serpentine) consisting essentially of a hydrous magnesium silicate usually having a dull green color and often a mottled appearance. The term sometimes used with soil, to indicate environmental conditions found on soils derived from serpentinite or peridotite. See Ultramatic.
Serpentine Soils	Soils developed on altered ultramafic rocks.
Serpentinite/Peridotite	The association of dark-colored, coarse-grained, iron and magnesium-rich igneous rock (peridotite) with the products of hydrothermal alteration and faulting of these rocks (serpentinite).
Silviculture	The art and science of growing and tending forest vegetation, i.e., controlling the establishment, composition, and growth of forests, for specific management goals.
Skyline Cable System	A harvest technology where cut logs are suspended above the ground and transported to a landing.
Slash	Woody material left after logging, pruning, thinning, brush cutting, or other management activities and/or accumulating there as a result of storm, fire, or other damage.
Snag	A standing dead tree.
Special Use Permit	A permit issued to an individual, organization, or company for use of national forest land for some specified purpose.
Species Diversity	The distribution and abundance of different plant and animal communities and species.
Speleology	The scientific study of the nature and origin of caves and cave life.
Stalactite	A columnar concretion descending from a cave ceiling, formed by the reprecipitation of carbonate in calcite form from percolating karst water.
Stalagmite	The reverse of a stalactite, being a column of reprecipitated carbonate ascending

	from a cavern floor and perpendicularly beneath a constant source of karst water percolating through the cavern roof or dripping off the lower extremity of a stalactite.
Stand	A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities and so form a silvicultural or management entity.
State Listed Species	Plant or animal species listed by the State of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.
Steelhead	A large-sized, silvery anadromous rainbow trout.
Successional Stage	A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax.
Suppression	The action of extinguishing or confining a fire.
T&E	Threatened and Endangered Species.
Terrestrial	Living on land; distinguished from aquatic (living in water).
Threatened Species	Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
Turbidity	The optical property of water as affected by suspension of material such as sediment, causing the muddy or cloudy state of water.
USDA	U.S. Department of Agriculture. Federal land management agency whose main mission is multiple use of lands under its jurisdiction.
USDI	U.S. Department of the Interior. Federal land management agency whose main mission is the protection and public use of the land, waters and minerals under its jurisdiction.
USFS	United States Forest Service.
USFW	United States Fish and Wildlife Service.
USGS	United States Geological Survey.
Ultramafic	Intrusive rocks composed chiefly of mafic minerals such as olivine, pyroxene, and serpentine. Also called ultrabasic. See Peridotite and Serpentine.
Understory	Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

VQO	Visual Quality Objective. Measurable standards for visual resource management based on the acceptable degree of alternation of teh characteristic landscsape.
Viewshed	A total landscape seen or potentially seen from specific points on a logical part of a travel route or water body.
Visual Resource	The composite of basic physiographic features and patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.
WRD	Water Resources Division, NPS, Fort Collins, Colorado. WRD serves as consultants to national park units for water resource issues.
Watershed	The land area drained by a river system.
Wetlands	Areas that are inundated by surface or ground water with a frequency sufficient to support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, wet meadows, river overflows, mud flats and natural ponds.
Wild, Scenic, and Recreational Rivers	Rivers or river segments which have been designated as part of the National Wild and Scenic Rivers System (Public Law 90-542, 1968).
Wilderness	All lands included in the National Wilderness Preservation System by public law; generally defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation.
Wildfire	Any wildland fire that is not a prescribed fire.
Windthrow	A tree or trees uprooted or felled by the wind.
Withdrawn	Land areas where certain uses are excluded.

Port Orford Cedar
(*Chamaecyparis lawsoniana*)

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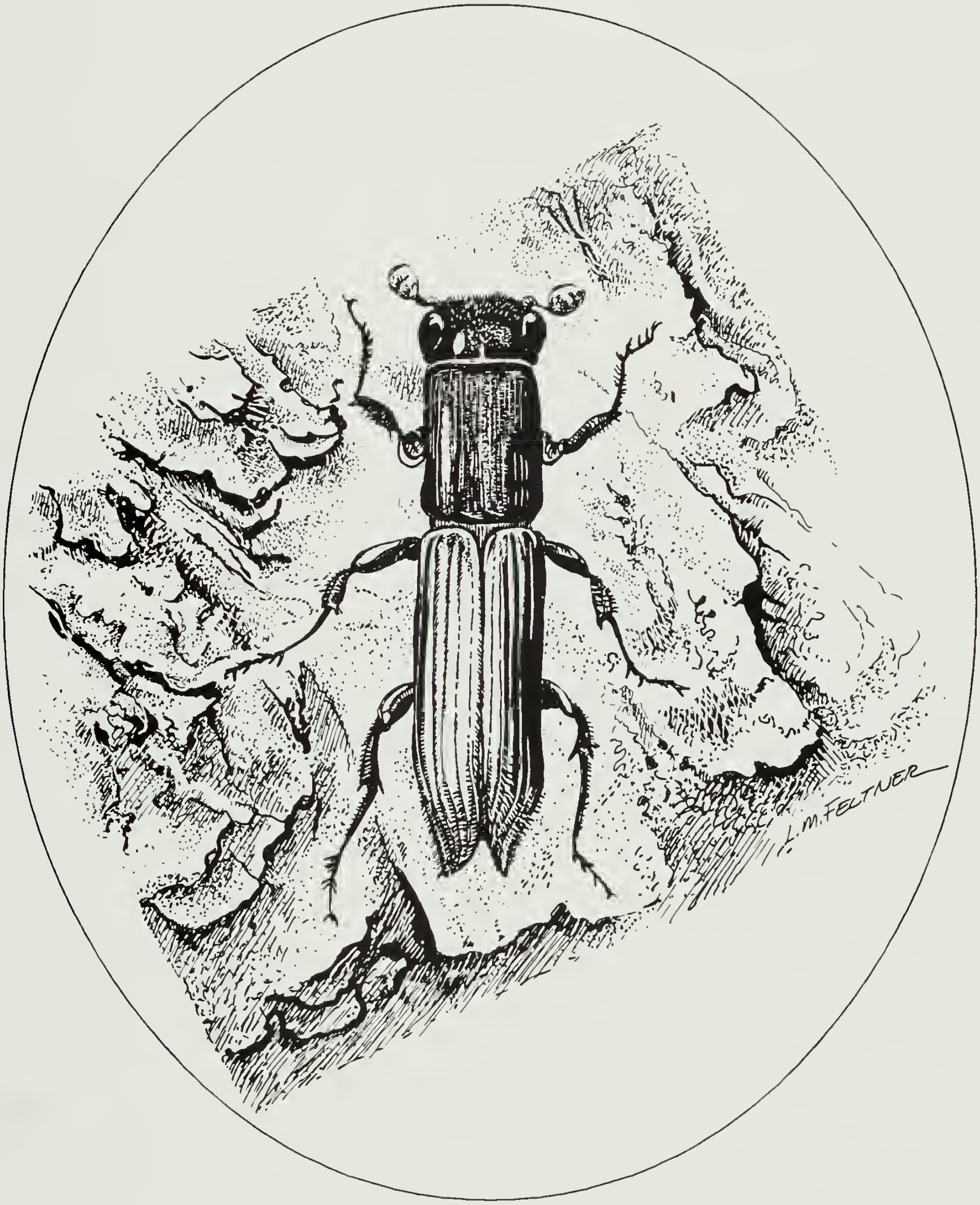

Ambrosia Beetle
(Platypus wilsoni)

Index

Index

Carrying Capacity **19, 27, 43. 58, 94, 95, 125, 210**

Critical Habitat **82, 210**

Cumulative Impacts **210, 74, 137, 146, 154, 163**

Development Concept Plan (DCP) **38, 43, 210**

Domestic or Public Water Supply **2, 3, 8, 9, 22, 24, 28, 29, 31, 32, 37, 46, 49, 53, 59, 62, 63, 75, 76, 105, 108, 121, 123, 133, 146, 151, 211, 225**

Endangered Species **9, 97, 102 , 177, 183, 193, 207, 210, 211, 216, 218**

Full Retention Visual **163, 211**

Government Performance Results Act (GPRA) **182, 195, 212**

Illinois Valley Visitor Center (IVVC) **3, 10, 11, 13, 15, 16, 20, 22, 23, 25, 28, 29, 31, 32, 34, 35, 36, 38, 43, 46, 47, 49, 50, 52, 54, 58, 59, 60, 64, 65, 89, 90, 91, 92, 94, 100, 101, 105, 111, 112, 116, 119, 121, 122, 123, 126, 197, 201, 212**

Late-Successional Reserves (LSR) **200, 213**

National Historic Landmark (NHL) **3, 51, 84, 87, 88, 123, 125, 214**

National Register of Historic Places **3, 5, 84, 86. 119, 214**

Old-Growth Associated Species **214**

Old-Growth Forest **9, 33, 74, 89, 101, 102, 103, 158, 163, 215**

Partial Retention Visual **10, 110, 215**

Prescribed Fire **78, 82, 215, 219**

Reforestation **158, 215**

Riparian Areas **79, 133, 134, 139, 147, 157, 216**

Scoping **13, 107, 113, 216**

Special Use Permit **124, 217**

Stalactite **69, 217, 218**

Stalagmite **69, 217**

Threatened and Endangered Species (T&E) **14, 82, 163, 218**

Threatened Species **5, 218**

Viewshed **9, 17, 20, 24, 28, 31, 37, 38, 46, 47, 49, 53, 59, 64, 110, 113, 114, 115, 141, 163, 198, 199, 200, 219**

Visual Resource **105, 110, 112, 219**

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